A List of the Butterflies of Borneo.

By J. C. Moulton, B.SC., F.E.S.

Curator of the Sarawak Museum.

PART IV.

Papilionidæ.

Parts I and II of this list, dealing with the Nymphalidæ and Lemoniidæ, were published by the late Mr. Shelford in this Journal in 1904 and 1905 (Nos. 41 and 45); Part III, on the Lycaenidæ by the present writer, appeared in 1911 (Journal No. 60). The present part deals with the Papilionidæ, which are divided into two Sub-families, (i) the *Pierinæ*, or Whites, of which 35 species are now known from Borneo, and (ii) the *Papilioninæ*, of which we know 43 Bornean species. The remaining part, dealing with the Hesperidæ, is in preparation.

SUB-FAMILY 1. PIERINÆ.

The progress of our knowledge of the Bornean *Pierinæ* may be seen from the following figures:—Snellen van Vollenhoven[1] in 1865 recorded 13 species from Borneo, one of which probably does not occur in Borneo at all. Two years later, A .R. Wallace[2] published his important paper "On the *Pierinæ* of the Indian and Australian Regions." In this he gives 24 species from Borneo. Druce[3], writing on Low's collections from Borneo gives 25. Distant[4] however records only 20 in his great work "Rhopalocera Malayana," published from 1882-1886; the same writer and W. B. Pryer[5] in 1887 record 28 species; W. B. Pryer and D. Cator[6] published a list in the "British North Borneo Herald," giving 35 Pierines. Bartlett[7] published a similar list in the "Sarawak Gazette" in 1896, in which he records 47 species. Since that date a few forms have been described by various authors, while others

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[1] Snellen van Vollenhoven, *Essai d'une Faune entomologique de l'-Archipel Indo-Néerlandais.* Second monographie: Famille des Pierides, 1865, pp. 1-70, plates I-VII.

[2] A. R. Wallace, *Trans. Ent. Soc. Lond.*, 1867, pp. 301-415, plates VI-VIII.

[3] H. Druce, *Proc. Zool. Soc. Lond.*, 1873, pp. 337-371, pl. XXXII and XXXIII.

[4] W. L. Distant, *Rhopalocera Malayana*, 1882-1886.

[5] W. L. Distant and W. B. Pryer, *Ann. Mag. Nat. Hist.* (5) XIX., pp. 41-56, 264-275, 1887.

[6] W. B. Pryer and D. Cator, *Brit. North Borneo Herald*, 1894, pp. 285, 286.

[7] E. Bartlett, *Sarawak Gazette*, 1896, pp. 220-222.

Jour. Straits Branch R. A, Soc., No. 67, 1914.

have been reduced to synonyms. Fruhstorfer[1] in "Seitz's Macrolepidoptera of the World," the latest work on the Butterflies of the Malayan region, recognizes some 45 different forms. In the present paper we recognize 35 species, to which we add 5 subspecies, making 40 different forms in all. It will thus be seen that of late years very little has been added, so we may regard our list as tolerably complete. Very little of Borneo now remains unexplored and we doubt if any butterfly so large and conspicuous as a Pierine still remains unknown. With obscure butterflies like LYCAENIDÆ and HESPERIDÆ the case is different and we may still expect to turn up an occasional new species.

The only new name introduced among the Pierines in the present paper is for a ♀ form of No. 575, *Appias melania athena* which I have called ***ochracea***, form. nov.

The only departure from the arrangement followed in the last three parts of this list, is the introduction of Keys for the identification of the genera and species. It is hoped that these may be of some use to those who have occasion to study Bornean Butterflies.

The Pierine genera occurring in Borneo may be distinguished thus:—

1 Fore-wing with three or four sub-costal nervules, never with five.	
2 Upper radial in fore-wing emitted beyond cell from sub-costal nervule.	
3 Fore-wing with three sub-costal nervules; costa not serrated.	
4 Second sub-costal nervule emitted from sub-costal nervure	LEPTOSIA.
4^1 Second sub-costal nervule emitted from third ..	DELIAS.
3^1 Fore-wing with four sub-costal nervules.[2]	
4 Costa strongly serrated	PRIONERIS.
4^1 Costa not serrated.	
5 Hind-wing with pre-costal vein.	
6 Fore-wing: second sub-costal nervule emitted before end of cell.	
7 Fore-wing: fourth sub-costal emitted near apex.	
8 Fore-wing: cell long.	
9 Males without abdominal tuft of hairs	HUPHINA.
9^1 Males with abdominal tuft of hairs	APPIAS.
8 Fore-wing: cell short	UDAIANA.
7 Fore-wing: fourth sub-costal nervule emitted before apex.	IXIAS.
6^1 Fore-wing: second sub-costal nervule emitted at apex of cell.	

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[1] H. Fruhstorfer, *Seitz, Macrolepidoptera of the World*, pp. 119-188, 1910.

[2] *Appias panda distanti* usually has three only in the female, but the absence or presence of the fourth sub-costal in this species is a variable feature.

7^2 Hind-wing strongly angulate at end of third median nervule .. .. DERCAS.
7^1 Hind-wing rounded .. .. .. CATOPSILIA.
5^1 Hind-wing without pre-costal vein.
6 First sub-costal in hind-wing emitted from end of cell .. .. TERIAS.
6^1 First sub-costal in hind-wing emitted before the end of cell. .. .. .. GANDACA.
2^1 Upper radial emitted from end of cell in fore-wing .. HEBOMOIA.
1^1 Fore-wing with five sub-costal nervules .. .. .. PARERONIA.

Genus, LEPTOSIA, Hübn.

557. ***Leptosia xiphia***, Fab.

Papilio xiphia, Fabricius, Spec. Ins. II., p. 43, 1781.
Pontia nina, Vollenhoven, Mon. Pier., p. 3, 1865.
Pontia nina, Wallace, Trans. Ent. Soc. Lond., p. 317, 1867.
Pontia xiphia, Druce, Proc. Zool. Soc. Lond., p. 354, 1873.
Leptosia xiphia, Distant, Rhop. Malay., p. 288, pl. XXVI, fig. 8, 1885.
Leptosia xiphia, Distant and Pryer, Ann. Mag. Nat. Hist., (5) XIX., p. 269, 1887.
Leptosia xiphia malayana, Fruhstorfer, Seitz Macrolep., p. 121, 1910.

Distribution: India and Malaya. Usually very common, from the plains up to 7000 ft.

(a) *Leptosia xiphia malayana*, Fruhstorfer.

A common species in Sarawak. This form also occurs in Sumatra and the Malay Peninsula.

Genus, DELIAS, Hübn.

The following key applies to Bornean forms only.

1 No red spot at base of hind-wing below.
2 Fore-wing below white, veins and apex fuscous; basal area of hind-wing below yellow.
3 Hind-marginal border of spots to hind-wing below not red.
4 Hind-marginal spots whitish grey. Expanse of wings 68-80 mm. .. .. SINGHAPURA.
4^1 Hind-marginal spots whitish. Expanse of wings 52-56 mm. .. .. CATHARA.
3^1 Hind-marginal border of red spots to hind-wing below .. .. DIVA.
2^1 Fore-wing below grey-fuscous with whitish spots; basal area of hind-wing below fuscous.
3 Basal half of cell in hind-wing below dark fuscous .. .. CINERASCENS.
3^1 Cell of hind-wing beneath yellow .. .. .. NAUSICAA.
1^1 A long red basal spot below costa on hind-wing beneath.
2 Hind-marginal row of spots in hind-wing below yellow. Fore-wing above in female black, no white bar closing cell .. .. [GLAUCE.]
2^1 Hind-marginal row of spots in hind-wing below red. Fore-wing in female above black with white bar closing cell .. .. EUMOLPE.

1^2 Basal region of hind-wing below (from costa to inner-margin) red.
  2 Base of costa to cell of hind-wing above not red.
    3 Broad pale band across hind-wing above from costa to inner margin. .. .. AGLAIA.
    3^1 Bright yellow band across hind-wing above from costa as far as cell only .. .. PANDEMIA.
  2^1 Base of costa and just into cell of hind-wing above bright crimson .. .. PARTHENIA.

558. *Delias singhapura*, Wallace.

Thyca singhapura, Wallace, Trans. Ent. Soc. Lond., p. 353, pl. VII, fig. 2 ♂, 1867.
Delias singhapura, Druce, Proc. Zool. Soc. Lond., p. 355, 1873.
Delias singhapura, Distant, Rhop. Malay, p. 293, fig. 100 ♂, 1885.
Delias singhapura, Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 269, 1887.
Delias singhapura, von Mitis, Iris, VI, pp. 108 and 142, 1893.
Delias singhapura, de Nicéville, Journ. As. Soc. Beng. LXIV, p. 489, 1895.
Delias singhapura, Butler, Ann. Mag. Nat. Hist., (6) XX, p. 156, 1897.
Delias singhapura, Shelford, Journ. Str. Br., Roy. Asiat. Soc., No. 35, pp. 36 and 41, 1901.
Delias singhapura indistincta, Fruhstorfer, Seitz Macrolep., p. 124, pl. 55, d, ♂ and ♀, 1910.

Distribution: Tenasserim south to Borneo and Sumatra.

North Borneo (Low); Sandakan and Labuan (Butler); Mt. Kinabalu, 2700-3500 ft., Mt. Matang, 3200 ft., Mt. Santubong, 2600 ft., Mt. Penrissen, 4000 ft., Bau and Kuching (Sar. Mus.); South Borneo (Fruhstorfer); S. E. Borneo and Marapok (Adams coll., Brit. Mus.). Also recorded from Singapore and Sumatra.

(a) *Delias singhapura singhapura*, Wallace.

A closely allied sub-species, *D. agoranis*, Gr.-Smith, occurs in Tenasserim and the Shan States. Fruhstorfer separates the Bornean form as a separate sub-species "the fore-wing beneath with the black shading twice as broad as in the preceding" (*singhapura*). A long series in the Sarawak Museum shows that this difference cannot be maintained, as there are some agreeing exactly with Wallace's description and figure of *singhapura* and others with Fruhstorfer's *infumata;* there are also individuals showing a complete gradation between the two forms. The hind-marginal dark shading on the upperside of the hind-wing as shown in Fruhstorfer's figure of the male *infumata* is even more developed in one specimen from Kinabalu, and another example from low country in Sarawak agrees well with the *infumata* form. But others show hardly any fuscous shading on the upperside of hind-wing at all. The shading on the apex of fore-wing varies in intensity in individuals. On the underside the dark shading also varies in development. Two females from Kinabalu (the only females in the Sarawak

Museum) have the veins on the underside more emphasized with dark fuscous shading than in the male; the four lower spots of the hind-marginal row in the hind-wing beneath are greyish as in the male, not yellow as in Fruhstorfer's figure of the female.

A common species on Kinabalu and on Sarawak mountains; but apparently very rare in Singapore and Sumatra, from which countries only single specimens are known.

559. *Delias baracasa,* Semper.

Delias baracasa, Semper, Schmett. Philipp. Ins., p. 230, pl. XXXIV, fig. 2 ♂, 1890.

Delias hyparete, var. *c. mindanaensis* aberr. *baracasa,* von Mitis, Iris, VI, pp. 106 and 140, 1893.

Delias cathara, Grose-Smith Ann. Mag. Nat. Hist., (6) Vol. XII, p. 34, 1893 and Rhopal. Exot. II, Delias, p. 17, pl. V, figs. 7, 8, ♂, 1895.

Delias cathara, Butler, Ann. Mag. Nat. Hist. (6) XX, pp. 156, 157, 1897.

Delias cathara, Shelford, Journ. Str. Br., Roy. Asiat. Soc., No. 35, pp. 36 and 41, 1901.

Delias baracasa cathara, Fruhstorfer, Seitz Macrolep., p. 124, pl. 55, d, ♂, 1910.

Distribution: Borneo and Mindanao.

(a) Delias baracasa cathara, Gr.-Smith.

Mt. Kinabalu, 3100 ft., Mt. Penrissen, 3500 ft., Kuching[1] (Sar. Mus.). One other in the Sarawak Museum bears a label "origin rather doubtful but most probably Mt. Matang, June 1907."

This form is only known from the mountains of North Borneo and Sarawak. The type form, *baracasa,* is described from a male, the only known specimen, from South-east Mindanao. From Semper's figure and description it seems very doubtfully distinct from *cathara.* Fruhstorfer notes as a distinction that only the base of the hind-wing is suffused with greenish yellow in *baracasa* and that *cathara* has "entirely yellow upper (*sic*) surface to the hind-wing. Presumably he meant to write *under* surface, as Grose-Smith describes and figures this species with milky-white fore- and hind-wings above. As regards the hind-wing beneath, Semper's figure shows *baracasa* with pale yellow hind-wing, more greenish-yellow at base; a Kinabalu example of *cathara* is similarly yellow at the base but much paler post-discally.

Butler notes the suggestion of von Mitis that "*D. baracasa* is most certainly nothing more than an aberration of *D. mindanaënsis,* in which the whole of the marginal spots on the under-surface of the hind-wings have become white." Butler then writes, "If this is correct, *D. cathara* must be a parallel form of *D. hyparete.*" Apart from the difference in size between the species, which Butler points out, the difference in size and arrangement of the marginal spots in *hyparete* is most marked; the two anal spots are very large, the next medium and the hind-marginal spots very small. In *cathara* they are all uniformly small. The hind-wing of *cathara* also is proportionately narrower than in either *singhapura* or *hyparete*. As Butler remarks, it falls naturally into the *singhapura* group. If anything it might be considered a dwarf form of *singhapura*. Those in the Sarawak museum measure 52-56 mm. compared with 68-80 mm. of *singhapura*. A small *hyparete* from Kinabalu 60 mm. compared with 70-75 mm. of ordinary *hyparete* suggests a parallel case. But for the present it seems best to treat it as a separate species.

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[1] Mountain forms are occasionally found in the low country round Kuching.

D. dives, de Nicéville, from Penang is a sub-species of *agostina*, certainly not of *baracasa* as Fruhstorfer places it.

In the Sumatran subspecies, *danala*, de Nicév., the hind-marginal spots below are yellow instead of white.

560. ***Delias hyparete,*** Linn.

Papilio hyparete Linn., Syst. Nat. (X) i. p. 469, 1758.
Thyca hyparete, Wallace. Trans. Ent. Soc. Lond., p. 352, 1867.
Delias hyparete, Druce, Proc. Zool. Soc. Lond., p. 355, 1873.
Delias hyparete, var. *metarete*, Distant, Rhop. Malay., p. 292, pl. XXIV, fig. 13 ♂, *nec* 14 ♀, 1885.
Delias hyparete, var. *metarete*, Distant and Pryer[1], Ann. Mag. Nat. Hist. (5) XIX, p. 269, 1887.
Delias hyparete var. *metarete*, von Mitis, Iris, VI, p. 106, 1893.
Delias metarete, Butler, Ann. Mag. Nat. Hist. (6) XX, p. 145, 1897.
Delias hyparete, Butler, *l.c.*, p. 146.
Delias hyparete diva, Fruhstorfer, Seitz Macrolep., p. 125, pl. 51, b ♀, 1910.
Delias metarete, Moulton, Journ. Str. Br., Roy. Asiat. Soc., No. 63, p. 84, 1912.

The typical *hyparete* occurs in Java; sub-species are found from the Himalayas and Formosa south to the Malay Peninsula and Archipelago as far as Bali, Celebes and the Philippines.

(a) Delias hyparete diva, Fruhstorfer.

Mt. Kinabalu up to 3000 ft., Limbang, Kuching, Mt. Matang, 3200 ft., Mt. Santubong, 2600 ft. (Sar. Mus.). A common species.

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[1] Distant and Pryer (*l.c.* p. 270) describe *Delias lucina* in their list of the "Rhopalocera of North Borneo," but without giving any locality. This however is supplied by Butler in 1897 and by Fruhstorfer in 1911 as Sulu Islands, and Staudinger's *joloana* is given as a synonym. In his introductory notes Pryer states that " a considerable number of the specimens mentioned " were taken in the Sandakan district; but he also mentions having collected in the Philippines, so I think it is unnecessary to include this species in our Bornean list.

This sub-species is only known from Borneo. Those from the Malay Peninsula, Sumatra, Luzon and Formosa show the nearest relationship.

Fruhstorfer writes of *diva* "the yellow shade on the hind-wing again reaches the much broader proximal black bordering of the sub-marginal red spots, which are still more prominent." This is only true of the females, though in some of these the post-discal region is white as in the males, thus approaching *niasana*. In a male from Mt. Matang the fuscous line inwardly bordering the red spots of the hind-wing below is almost obsolete thus approaching the Indian form *hierte*.

Distant describes two forms of female, of which the darker (*form b*) is probably true *metarete*, the lighter the Bornean form *diva*, though he remarks that Sarawak specimens in his collection agree with the form found in the Peninsula. Sarawak males certainly agree well with his description and figure, as do the females with his description of the female *form a;* but I have seen no Bornean specimens dark enough for *metarete* and therefore regard that as the Malay Peninsula form.

561. *Delias orphne*, Wallace.

Thyca orphne, Wallace, Trans. Ent. Soc. Lond., p. 361, pl. VIII, fig. 2 ♂, 1867.

Delias georgina, var. *cinerascens*, von Mitis, Iris, VI, pp. 103 and 126, pl. II, fig. 2 ♀, 1893.

Delias cinerascens, Butler, Ann. Mag. Nat. Hist. (7) XX, p. 166, 1897.

Delias hermione, Shelford, Journ. Str. Br., Roy. Asiat. Soc., No. 35, p. 41, 1901.

Delias orphne cinerascens, Fruhstorfer, Seitz Macrolep., p. 130, pl. 54, e ♂, 1911.

Delias hermione, Moulton, Journ. Str. Br., Roy. Asiat. Soc., No. 63, p. 84, 1912.

Distribution: Malacca, Borneo and Sumatra.

(a) *Delias orphne cinerascens*, von Mitis.

Mt. Kinabalu, 3000 to 5150 ft., Mt. Selinguid, 4850 ft., Mt. Matang 3200 ft. (Sar. Mus.).

The typical form (*orphne*) comes from Mt. Ophir near Malacca. The above sub-species is confined to the mountains of North Borneo and Sarawak. Fruhstorfer regards *simanabum* from Sumatra as another sub-species.

The *cinerascens* form was common on the Marei Parei spur of Kinabalu in September and I have seen it equally common on the summit of Mt. Selinguid 200 miles further south. The single example from Mt. Matang (near Kuching, Sarawak) was taken in December 1898.

The males from Kinabalu have the apex and hind-margin of the fore-wing above more strongly shaded with grey. In two examples from Selinguid the shading is entirely absent, only the narrow dark marginal line from apex towards anal angle left; in a third the shading is faint; in two others nearly as pronounced as in the Kinabalu specimens.

An allied species *georgina,* Feld., occurs on Luzon, with a sub-species *battana,* Fruhst., which flies on Bonthain in South Celebes at an altitude of 5000-6000 ft.

Shelford notes that it is "exactly mimicked by a *Chalcosid* moth *Mimeuploea pieroides,* Wlk." Both moth and butterfly were captured on Kinabalu in September 1913.

Of *orphne* Fruhstorfer writes "Hitherto only 1 ♀ known, which Wallace caught on Mt. Ophir, Malacca." Wallace describes and figures a *male;* Kirby[1] and Butler[2] mention *two males* in the British Museum. Lastly, Whitehead[3], who visited Mt. Ophir, writes in his account of it, "butterflies were represented by one common white and yellow species, *Delias orphne.*"

The female is apparently undescribed, so I append a description[4] from a specimen kindly lent me for study by Dr. R. Hanitsch, Director of the Raffles Museum, Singapore, who informs me that it was taken on Mt. Ophir, alt. 2400 ft., August, 1905.

562. *Delias blanca,* Felder.

Pieris blanca, Felder, Wien Ent. Mon. VI, p. 284, 1862.
Delias nausicaa, Fruhstorfer, Berl. Ent. Zeit., p. 60, 1899.
Delias blanca nausicaa, Fruhstorfer, Seitz Macrolep., p. 131, pl. 54 f, 1911.

Distribution: Luzon, Mindanao and Borneo.

(a) *Delias blanca nausicaa,* Fruhst.

Only two examples (a pair) of *nausicaa* are known; they were taken on Kinabalu by Waterstradt.

The typical form (*blanca*) is only known from two males from North Luzon; another sub-species, *apameia,* Fruhst., from Mindanao is only known from females.

[562a. *Delias belisama glauce,* Butler.

Papilio belisama, Cramer, Pap. Exot. III, pl. CCLVIII, A—D, 1782.

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[1] *Catalogue of the Hewitson collection in the British Museum,* 1879, p. 21.

[2] *Ann. Mag. Nat. Hist.* (6) XX, p. 166, 1897.

[3] *The Exploration of Kina Balu,* p. 16, 1893.

[4] *Upperside.* Grey fuscous. Fore-wing, with markings as in female *cinerascens* but much more darkly dusted with grey-fuscous. Hind-wing entirely grey-fuscous, but lightly dusted with yellow scales, the median veins with white scales. Inner margin yellowish white.

Underside. As in the male figured by Wallace. Exp. al. 56 mm.

Type female: Mt. Ophir (Padang Batu, alt. 2400 ft.), Johore territory, Malay Peninsula, August 1905, Coll. R. Hanitsch (Raffles Museum, Singapore).

Pieris glauce, Butler, Proc. Zool. Soc. Lond., p. 431, pl. XXV, fig. 2, ♂, 1865.
Thyca glauce, Wallace, Trans. Ent. Soc. Lond., p. 349, 1867.
Delias glauce, de Nicéville, Journ. Asiat. Soc. Beng. LXIV, p. 488, 1895.
Delias glauce, von Mitis, Iris VI, p. 105, 1893.
Delias glauce, Butler, Ann. Mag. Nat. Hist. (6) XX, p. 150, 1897.
Delias belisama glauce, Fruhstorfer, Seitz Macrolep., p. 132, pl. 52 e, ♂, ♀, 1911.

The typical form is common in Java. The sub-species *glauce* was described from Borneo and is recorded as common in Sumatra, where it is mimicked by *Prioneris hypsipyle*, Weymer, a form of *Prioneris* not found in Borneo.

It is curious that this large and conspicuous species, which is so common in Sumatra, does not seem to have been collected in Sarawak; and I can find no record of its capture in Borneo beyond that of the original example from which *glauce* was described.

Wallace, however, in recording *belisama* from Java and Sumatra, writes of *glauce* " Hab.-Borneo (B.M.) a well-marked local form of *T. belisama*."

But I am inclined to think that *glauce* does not occur at all on Borneo, but that it is confined to Sumatra. It evidently belongs to one big species, of which *D. descombesi* is the continental form (which, curiously, also occurs on the lesser Sunda Islands). In Java we get *belisama*, in Sumatra *glauce*, in Celebes *zebuda*, in Mindanao *diaphana* and in Borneo *eumolpe*. The occurrence of *glauce* side by side with *eumolpe* would be peculiar, especially as we now know that *eumolpe* is not confined to Kinabalu but is also found in Western Sarawak, thus precluding the idea that *glauce* might be the Sarawak form of the Kinabalu *eumolpe*. I do not know of the occurrence of this latter species in South Borneo and it is possible that the Sumatran *glauce* may replace it there.][1]

563. ***Delias eumolpe***, Gr.-Smith.

Delias eumolpe, Grose-Smith, Ann. Mag. Nat. Hist. III, p. 312, 1889.
Delias eumolpe, Grose-Smith and Kirby, Rhop. Exot., II. Delias, p. 5, pl. II, figs. 1, 2 ♂, 1893.
Delias eumolpe, von Mitis, Iris, VI, p. 104, 1893.

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[1] Since writing the above I have received the following note from Mr. N. D. Riley of the British Museum, who was kind enough to look up the matter for me.

He writes thus:—"In reply to your enquiries of 29th Dec., 1913 re *D. glauce* Butler, received to-day, you are quite correct in your surmises re the locality of the Type. Though labelled Borneo, and described from Borneo, yet the specimen is entered in the Register quite distinctly as from "Sumatra." This you may be sure is the correct locality. We have besides the Type 4 ♂♂, 3 ♀♀ in B. M. and 7 ♂♂, 5 ♀♀ in Adams Collection all from Sumatra."

Delias eumolpe, Shelford, Journ. Str. Br., Roy. Asiat. Soc., No. 35, pp. 35 and 41, ♀, 1901.
Delias eumolpe, Fruhstorfer, Seitz Macrolep., p. 132, pl. 53 b, ♂ and ♀, 1911.

Mt. Kinabalu 3-4000 ft., Mt. Penrissen 4000 ft. (Sar. Mus.). The males were common on Kinabalu in August and September. Mr. Shelford obtained a pair on Mt. Penrissen in Sarawak. In the female the hind-wing beneath has the yellow ground-colour more dusted with fuscous scales than in Kinabalu females. On the hind-wing of the female above the white discal area is similarly obscured with fuscous scales, and the white oblique bar at the end of the cell in the fore-wing is narrower. I found more examples of this form on Mt. Merinjak 2200 ft. (near Penrissen) in May 1914.

As noted on page 9 this form is not known elsewhere, but it probably represents the continental *descombesi* on Bornean mountains.

Among the Kinabalu specimens is a small male measuring only 62 mm. across the wing, which may be noted in comparison with the average of 78-80 mm. Another male has the ground-colour of the hind-wing below a very pale yellow instead of the ordinary deep yellow.

564. *Delias aglaia*, Linn.

Papilio aglaia, Linn., Syst. Nat. I, p. 465, 1758.
Thyca parthenope, Wallace, Trans. Ent. Soc. Lond., p. 347, *in parte nec* pl. VI, figs. 5, 5a, *nec* pl. VII, fig. I, 1867.
Delias dione, Distant, Rhop. Malay., p. 290, pl. 24, figs. 5 and 6, 1885.
Delias pasithoe, var., Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 269, 1887.
Delias parthenope, von Mitis, Iris, VI, pp. 101 and 121, 1893.
Delias parthenope, Butler, Ann. Mag. Nat. Hist. (7) XX, p. 163, 1897.

Sarawak: Kuching, Mt. Matang, 3,200 ft., Mt. Santubong, 2600 ft., February, April and June, 1897, 1900 and 1902 (Sar. Mus.).

Distribution of aglaia: Formosa, China, India, Malay Peninsula, Sumatra, Nias, Borneo and Palawan. The typical form is confined to India.

Various writers record it from Borneo under different names, thus: *parthenope* (Wallace)[1], *dione* (Distant), *aglaia* (Moore), *pasithoe* (Pryer and Cator).

The Sarawak males differ from the Indian males, as figured by Hübner, Drury and Moore, in the development of the postdiscal band of white spots on the hind-wing above. Only slight traces of the two upper spots are visible, the spot on the costa is also hardly distinguishable. On the underside of hind-wing the second long hind-marginal yellow spot is divided by a fuscous line in some specimens, partially divided in another and quite undivided in others. The next long yellow spot below, however, is always divided by a broad fuscous bar and in this point differs from *parthenope*, Wallace. But in his description of *parthenope*, Wallace writes "in the Bornean specimen in the British Museum one of the yellow patches beyond the cell is partly divided, showing an approach to the *pasithoe* form."

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[1] Wallace figures the Singapore form which is taken as the true *parthenope*.

Distant's figures of *dione*, male and female, illustrate the above points. The Sarawak female agrees better with Moore's figure of that sex in which the fore-wing below has the apical half grey fuscous, relieved by hind-marginal row of white spots and two more at the end of cell. These are enclosed by the apical fuscous region.

The whitish markings of the fore-wing above and below in typical specimens are distinctly yellow in one male.

Most writers remark on the variability of *aglaia*, so I refrain from giving these Bornean specimens a distinctive name, since no doubt a long series of examples from neighbouring regions would show individuals like those from Borneo. In the north it appears to be replaced by the next species, though Pryer records "*pasithoe* var." in his list for North Borneo, which may be the same as the Sarawak form of *aglaia*.

565. ***Delias pandemia***, Wallace.

Thyca pandemia, Wallace, Trans. Ent. Soc. Lond., p. 346, pl. VI, figs. 4, 4a ♂, 1867.

Delias pandemia, Druce, Proc. Zool. Soc. Lond., p. 355, 1873.

Delias pandemia, Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 269, 1887.

Delias pandemia, von Mitis[1], Iris, VI, pp. 101 and 123, 1893.

Delias pandemia, Butler, Ann. Mag. Nat. Hist. (7) XX, p. 163, 1897.

Delias pandemia, Fruhstorfer, Seitz Macrolep., p. 134, pl. 56 b, ♀, 1911.

Delias pandemia, Moulton, Journ. Str. Br., Roy. Asiat. Soc., No. 63, p. 85, 1912.

North Borneo (Low); Labuan (Butler); Mt. Kinabalu, Lawas, Limbang (Sar. Mus.).

Confined to Borneo and Palawan. Common in certain localities in northern Sarawak, but not further west than the Limbang river.

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[1] This author also records the Javan species *crithoe* from Borneo. He writes (*l.c.* p. 125), "Ich hatte Stucke aus Java und Borneo vor mir. Ein im Kaiserlichen Museum in Wien befindliches, von der beruhmten Reisenden Ida Pfeiffer auf Borneo erbeutetes ♀ ist auffallend breitflugelig."

Madame Pfeiffer visited Sarawak in 1851, journeying thence overland to Pontianak and from there on to Java. I suspect that her specimen has been wrongly labelled. It is unlikely that *crithoe* should occur in Borneo; if so, it is remarkable that in all these years no other specimen has been recorded from this country.

566. *Delias ninus*, Wallace.

Thyca ninus, Wallace, Trans. Ent. Soc. Lond., p. 347, pl. VI, figs. 5, 5a ♂, *nec* pl. VII, fig. 1, 1867.

Delias parthenia, Staudinger, Iris, V, p. 449, 1892.

Delias parthenia, von Mitis, Iris, VI, pp. 100 and 119, 1983.

Delias parthenia, Butler, Ann. Mag. Nat. Hist. (7) XX, p. 165, 1897.

Delias parthenia, Shelford, Journ. Str. Br., Roy. Asiat. Soc., No. 35, pp. 36 and 41, 1901.

Distribution: Malay Peninsula, Sumatra and Borneo.

(a) Delias ninus parthenia, Staudinger.

Mt. Kinabalu, Madihit, Malinau, Mt. Penrissen (Sar. Mus.).

The typical form (*ninus*) comes from the Malay Peninsula, a closely allied sub-species (*alluviorum*) from Sumatra and the above sub-species, which is only known from the mountains of North Borneo and Sarawak.

The two females from Penrissen differ from Kinabalu females in the reduction of the yellow discal region of the hind-wing above, caused by a dusting of fuscous scales beyond the cell. The female of *D. eumolpe* from this locality showed a similar tendency to melanism.

Genus, PRIONERIS, Wallace.

The species of this genus are distinguished by the conspicuously dentate or roughened costal margin of the forewing in the males. The genus is confined to India, the Malay Peninsula and Greater Sunda Isles.

The two Bornean species are almost exactly alike on the upperside, but they are easy to distinguish on the underside.

1 Hind-wing below yellow; no white beyond cell; no red spot at base of wing below costa .. .. CORNELIA.
1¹ Hind-wing below yellow; large white spots beyond cell; a red spot at base of wing below costa .. .. .. VOLLENHOVII.

567. *Prioneris cornelia*, Vollenh.

Pieris cornelia, Vollenhoven[1], Mon. Pier., p. 5, pl. 2, fig. 2, ♂. 1865.

Prioneris cornelia, Wallace, Trans. Ent. Soc. Lond., p. 386, 1867.

Prioneris cornelia, Druce, Proc. Zool. Soc. Lond., p. 355, 1873.

Prioneris cornelia, Fruhstorfer, Seitz Macrolep., p. 136, pl. 57 d, 1911.

Mt. Kinabalu, Malinau and Mt. Matang (Sar. Mus.).

Only known from Borneo. Rather an isolated species, to which the Indian *P. thestylis* is the nearest. Wallace remarks on the resemblance of this species to *Delias singhapura*. Fruhstorfer however does not accept the suggestion that the rarer *Prioneris* species mimic the commoner *Delias* species, as "mimicry among the in all respects harmless Pierids appears no sort of protection, and properly speaking the smooth-margined *Delias* should rather copy the armed *Prioneris,* if there is assumed to be mimicry at all."

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[1] Vollenhoven describes it from "un seul individu male de Borneo, don de la societé royale zoologique d'Amsterdam."

The *Delias* species in Borneo are slow fliers, and easy to capture, as long as they fly reasonably low; this characteristic together with their generally conspicuous colouring suggests that, like Euploeas and Danaids, they possess some unpalatable qualities which render them more or less safe from attack. If the "armed" costa of the *Prioneris* be taken as an unpalatable quality, it suggests a case of Mullerian mimicry, where two distasteful forms escape with half the loss of the number of individuals of each species from young and inexperienced enemies, by living under the protection of the same pattern. But possibly the dentate costa may have a sexual significance, possibly for stridulating purposes as in the South American species of *Ageronia* . This roughened costa is also found in *Catopsilia* and some Papilios.

Unfortunately both the Bornean species are confined to mountainous district where they are rare. According to some writers the allied species *P. thestylis* is common in some parts of India and *P. autothisbe* is found abundantly in Java, so perhaps observers in those countries may be able to throw some light on this point.

568, *Prioneris clemanthe,* Doubleday.

Pieris clemanthe, Doubleday, Ann. Mag. Nat. Hist. XVII, p. 23, 1846.
Prioneris vollenhovii, Wallace, Trans. Ent. Soc. Lond., p. 386, pl. IX, fig. 3, ♂, 1867.
Pieris clemanthe, Druce[2], Proc. Zool. Soc. Lond., p. 354, 1873.
Prioneris vollenhovii, Druce, *l.c.* p. 355.
Prioneris clemanthe, Distant, Rhop. Malay., p. 295, 1885.
Prioneris vollenhovii, Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 270, 1887.
Prioneris vollenhovi, Fruhstorfer, Seitz Macrolep., p. 136, pl. 57 d, 1911.

Distribution:—Sikkim and Assam, south to Sumatra and Borneo.

(a) *Prioneris clemanthe vollenhovii,* Wallace.

Mt. Kinabalu, Mt. Matang, Kuching, Quop (Sar. Mus.).

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1. cf. Sharp, *Cambridge Natural History Series. Insects.* Vol. II, p. 354, 1901. In *Ageronia* a clicking noise is caused, apparently by an appendage bearing two hooks at the extreme base of the wing acting against two other processes on the thorax.

2. Druce records both "*Pieris clemanthe*" and "*Prioneris vollenhovii*" in his Bornean list. From his introductory remarks—"I have made the following endeavour to gather together the names of such species, as I could place specimens of in my own collection and study myself...... When they came into my hands......"—it is impossible to guess what his "*Pieris clemanthe*" was, presuming that *P. vollenhovii* was correctly identified.

This sub-species is only known from Borneo. The typical *clemanthe* comes from Sikkim and Assam, with other closely allied forms in Burma, the Malay Peninsula and Sumatra.

Fruhstorfer treats *vollenhovii* as a distinct species, but it seems inconsistent to place it on the same level of isolation as *cornelia;* that species has no close ally, *vollenhovii* on the other hand is extremely close to the forms from Burma, Malay Peninsula and Sumatra.

The application of sub-specific nomenclature must necessarily be arbitrary, depending on the individual opinion of each writer, but there is often an unfortunate tendency nowadays to obscure rather than illustrate geographical relationship. Thus a species inhabiting the Indo-Malayan region is split up into a number of sub-species, indicating that different forms of this one species are found in different localities. A number of forms thus divided up, say, over India, Burma, Malay Peninsula, Sumatra, Java and Borneo, gives us the impression that the countries forming this region have a similar fauna in a general sense (*i.e.* that a number of equally distinct forms cover this area), but that they have been separate for a sufficiently long period to enable each region to evolve *an equally distinct sub-species.* Now this is totally wrong and entirely obscures the fact that the forms of the Malay Peninsula, Sumatra and Borneo are almost invariably very much closer to one another than they are to those found in Java. One ought to have some system of showing the relative value of each sub-species compared with the type form. Perhaps in writing a list of species the following arrangement might be used, the lines before the sub-specific name indicating distant relationship, the absence of lines, a close relationship. Thus:

Type-form from Sikkim and Assam is *Prioneris clemanthe.*

Very closely allied sub-species from the Malay Peninsula and Sumatra, *Prioneris clemanthe themana.*

Very closely allied sub-species from Borneo is *Prioneris clemanthe vollenhovii.*

More distantly allied sub-species from Hainan is *Prioneris clemanthe | euclemanthe.*

Very distantly allied sub-species from Java is *Prioneris clemanthe | | philonome.*

To the general lepidopterist it is no doubt sufficient to know that *Prioneris clemanthe* inhabits the Indo-Malayan region, but to the student of any more restricted portion of that region, some more definite system is required. Sub-specific nomenclature is a step onwards, but there is still room for further improvement such as the arrangement suggested above.

Genus, ANAPHÆIS, Hübn.

[**568a. *Anaphaeis java coronea,*** Cr.

Pieris coronea, Vollenhoven, Mon. Pier., p. 29, 1865.
Pieris coronea, Wallace, Trans. Ent. Soc. Lond., p. 330, 1867.

Vollenhoven records this species from Java, Sumatra Timor, Celebes and Borneo, this last locality on the authority of Cramer; in Sumatra according to Boisduval.

Wallace doubts its occurrence in Sumatra or Borneo, and Doherty, an experienced collector in Malaya, writes as follows:—"Cramer records this species from Borneo, and in the Singapore Museum there is a specimen labelled Jelebu (not far from Malacca). These localities are certainly doubtful, as the butterfly inhabits dry, sterile coasts, and would be quite out of place in forest countries like Malacca or Borneo. On the other hand a coast-butterfly of exceedingly weak flight, but able to float in the air for an indefinite time, would be more apt to be blown out to sea than other insects, and more likely to survive till its arrival in another island. So that stragglers may really have been taken remote from the true habitat of the species." (*Journ. Asiat. Soc. Beng.* LX. p. 189, 1891). I can find no other records of it in these two countries, so we may safely exclude it from the Bornean list.]

Genus, HUPHINA, Moore.

1 Hind-wing of male above without orange-yellow anal patch PACTOLICUS.
1¹ Hind-wing of male above with orange-yellow anal patch.. LEA.

569. *Huphina pactolicus,* Butler.

Pieris pactolicus, Butler, Proc. Zool. Soc. Lond., p. 455, pl. XXVI, fig. 1, ♂, 1865.
Pieris pactolicus, Wallace, Trans. Ent. Soc. Lond., p. 338, 1867.
Pieris pactolicus, Druce, Proc. Zool. Soc. Lond., p. 355, 1873.
Huphina pactolicus, Butler, Ann. Mag. Nat. Hist. (7) III, p. 207, 1899.
Huphina pactolicus, Fruhstorfer, Seitz Macrolep., p. 142, pl. 64 c ♂, 1910.

Mt. Kinabalu, 3000 ft. (Sar. Mus.).

Originally described from "Bogota," an oversight which Wallace pointed out two years later. Only found in Borneo. Kirby (1879) records two examples in the Hewitson collection and Butler (1899) records seven in the British Museum, but neither give more definite locality than "Borneo." Fruhstorfer notes that it "occurs exclusively in alluvial land;" the only specimen in the Sarawak Museum was taken on Kinabalu. Fruhstorfer also states that it is very local, but common in the south-east of Borneo.

The female is unknown.

This is the Bornean form of the continental *nerissa.*

570. *Huphina lea*, Doubleday.

Pieris lea, Doubleday, Ann. Mag. Nat. Hist. XXVII, p. 23, 1846.
Pieris lea, Vollenhoven, Mon. Pier., p. 23, ♂, 1865.
Pieris amalia, Vollenhoven, *l.c.* ♀ (*nec* ♂), 1865.
Pieris lea, Wallace, Trans. Ent. Soc. Lond., p. 335, 1867.
Appias lea, Distant and Pryer[1], Ann. Mag. Nat. Hist. (5) XIX, p. 272, 1887.
Pieris amalia, Pagenstecher, Abhandl. d. Senckenb. Naturf. Ges. XXIII, p. 375, 1897.
Huphina hespera, Butler, Ann. Mag. Nat. Hist. (7) III, p. 208, 1899.
Huphina lea montana and *meridionalis*, Fruhstorfer, Berl. Ent. Zeit., p. 102, 1899.
Huphina lea montana, Fruhstorfer, Seitz Macrolep., p. 145, pl. 65, a, 1910.
Huphina lea hespera and *meridionalis*, Fruhstorfer, *l.c.* p. 145, 1910.

The typical form (*lea*) comes from Southern Burma, with several sub-species from Siam, Malay Peninsula, Sumatra, Banca, Natunas and Borneo. It seems to be a variable species and some of these so-called "sub-species" tend to intergrade[2].

(*a*) *Huphina lea montana*, Fruhstorfer.

Kinabalu (Fruhstorfer).

(*b*) *Huphina lea hespera*, Butler.

Kinabalu; Sarawak: Limbang to Lundu (Sar. Mus.); Sarawak and Labuan (Butler).

Butler also gives Singapore for this form. Fruhstorfer names the Malay Peninsula form *H. lea malaya*. Vollenhoven and Wallace give Borneo and Banca for *H. lea*, and

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[1] These authors also give "*Appias aspasia* Stoll" in their list of the "Rhopalocera of North Borneo." The typical form occurs in the Moluccas with subspecies ranging north to the Philippines, including Palawan and Balabac which are islands by no means far from Borneo, so that the occurrence of a form in North Borneo is certainly not impossible. However, the inclusion of *Delias lucina* in Pryer's "Bornean" list suggests the advisability of accepting this record with caution, and for that reason we prefer to omit it.

[2] Subspecific names are intended to indicate "species in the making." We know that all species are variable, in fact that no two individuals of any one species are exactly alike. From this variation arises the basis of evolution or the formation of new species. The over-zealous "splitting" of some recent authors suggests poaching on the preserves of future generations of systematists, who will be in a better position to judge of the success of any one species developing into another. The minute variations, which we now seize on and name as an incipient species, may after all come to nothing.

If we start naming every slight variation our task becomes endless. Many writers have shown how necessary it is to use the greatest restraint in describing new species. With subspecies it seems even more advisable to refrain from describing any, without first making sure that the form in question is not an unstable variety connected by transitional forms to the present species. A long series will indicate this; one specimen most certainly will not.

Sumatra for *H. amalia.* De Nicéville, however, writes—"I have a large suite of specimens of *H. lea* from Burma, the Malay Peninsula, Sumatra and Borneo, and am unable to find any constant character by which *H. amalia* can be distinguished from it."

The males from Kinabalu in the Sarawak Museum do not differ from Sarawak males. I have not seen females from this mountain, but from Fruhstorfer's figure of *montana* the only difference between it and *hespera* seems to be the absence of a fuscous border to the inner margin of the fore-wing above in his *montana* and a very slight reduction of the hind-marginal border of the hind-wing.

He remarks of *montana* (no sex, upper or underside indicated) that "the reddish tinge of the hind-wing has almost entirely disappeared." In Sarawak males on the upperside this is a variable character, as in some just the anal region is orange-tinged, the rest of the anal-inner-marginal region pale yellow; in another the whole of this is orange red. The underside of the hind-wing in these males is similarly variable, ranging from pale yellow to red-orange. The fuscous markings on the fore-wing above are also variable in development.

(c) *Huphina lea meridionalis,* Fruhstorfer.

South-east Borneo (Fruhstorfer); Samarinda (Pagenstecher)[1].

Noted as having the black distal border of the hind-wing extending to the cell, which is itself suffused with light yellow. The under surface of the hind-wing with large white spots beyond the cell.

Three Sarawak females have these white spots, in two they are yellow. The cell in hind-wing above is also suffused with pale yellow, but the hind-marginal border does not quite reach the cell.

A long series of females would doubtless show intermediate forms connecting all these three Bornean sub-species.

Genus, APPIAS, Hübn.

The following key applies to the Bornean forms only.

1 Neuration of hind-wing below marked out with fuscous scales except the median, submedian and interior nervures .. .. LYNCIDA ENARETE.

1^1 Neuration beneath not delineated with fuscous scales.

  2 General colouring red.

    3 Veins marked with fuscous scales .. NERO CHELIDON.

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[1] Pagenstecher notes that an example of *Pieris amalia* from Samarinda agrees with Distant's figure of the upperside; but "unterseitz sind die Aden schwarzlich angelaufen." It may be Fruhstorfer's *meridionalis* form.

- 3^1 Veins not marked with fuscous scales NERO FLAVIUS.
- 2^1 General colouring white or yellow.
  - 3 Hind-wing below fuscous .. .. PANDIONE WHITEHEADI.
  - 3^1 Hind-wing below white or yellow.
    - 4 Male pearly white except for grey-shaded costa in fore-wing. Female with narrow fuscous borders; yellow ground-colour or white with pearly sheen .. .. .. ALBINA NEOMBO.
    - 4^1 Male with white spotted fuscous apex.
      - 5 Apical region of fore-wing above in male lightly fuscous; hind-marginal spots on hind-wing above. Female with heavy fuscous margins above; hind-wing below yellow .. MELANIA ATHENA.
      - 5^1 Apical region of fore-wing above in male broadly black, relieved by two small white spots. Apex of hind-wing above lightly edged with black. Female with narrow black hind-marginal border to hind-wing above; below dirty white, not yellow .. .. .. LEPTIS PLANA.
- 1^2 Neuration of hind-wing beneath marked out with fuscous scales .. .. .. CARDENA.

571. *Appias lyncida*, Cramer.

Papilio lyncida, Cramer, Pap. Exot. ii. pl. 131, fig. B, ♂, 1779.
Pieris enarete, Boisduval, Spéc. Gén. Lep. i. p. 480, 1836.
Tachyris enarete, Wallace, Trans. Ent. Soc. Lond., p. 366, 1867.
Tachyris enarete, Druce, Proc. Zool. Soc. Lond., p. 355, 1873.
Appias enarete, var., Distant, Rhop. Malay., p. 312, fig. 102, ♂, 1885.
Appias enarete, Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 271, 1887.
Tachyris lyncida, Pagenstecher, Abhandl. d. Senckenb. Naturf. Ges. XXIII, p. 376, 1897.
Appias lyncida enarete, Fruhstorfer, Seitz Macrolep., p. 149, pl. 58 e, ♂, 1910.

Distribution of species: India and Ceylon east to Formosa and the Philippines and south to Celebes, Sumbawa, Flores and Java.

(*a*) *Appias lyncida enarete*, Boisduval.

Kinabalu, Lawas, Trusan, Satap, Quop (Sar. Mus.). North and South Borneo (Fruhstorfer). "Abundant on river-banks" (Pryer).

Boisduval describes this from the Moluccas, of which Wallace writes "This is doubtless an error, as I took it in Borneo, and it is so closely allied to the *T. hippo* of Malacca and Sumatra." In the Moluccas *Appias ada* Cramer replaces this species.

Distant describes the male as having sub-apical spot of fore-wing beneath white, not yellow as in *lyncida*. Sarawak examples mostly have it yellow; in one these spots are white, in others lightly dusted with pale yellow scales.

The females vary in size: exp. al. 50-63 mm.

572. *Appias nero,* Fab.

Papilio nero, Fabricius, Ent. Syst. III. i. p. 153, 1793.
Pieris nero, Vollenhoven, Mon. Pier., p. 47, 1865.
Tachyris nero, Wallace, Trans. Ent. Soc. Lond., p. 378, 1867.
Pieris figulina, Butler, Ann. Mag. Nat Hist. (3) XX, p. 399, pl. 8, fig. 1, 1867.
Tachyris nero, Druce, Proc. Zool. Soc. Lond., p. 355, 1873.
Appias nero, Distant, Rhop. Malay., p. 311, pl. XXIV, figs. 9 ♂, 10 ♀, 1885.
Appias nero, Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 271, 1887.
Appias flavius, Grose-Smith, Ann. Mag. Nat. Hist., p. 427, 1892.
Appias nero chelidon, Fruhstorfer, Deut. Ent. Zeit., p. 47, 1905.
Pieris nero, Piepers, Rhop. Java, p. 18, pl. II, fig. 1 ♀, 1909.
Appias nero chelidon, Fruhstorfer, Seitz Macrolep., p. 151, 1910.

A widely spread species ranging from Hainan and Burma south to the Malay Peninsula and Archipelago.

(a) *Appias nero chelidon,* Fruhstorfer.

Kinabalu, Limbang, Balinean, Bau, Quop (Sar. Mus.).

Sarawak forms vary from dark crimson to orange red. The veins are emphasized with fuscous scales.

Wallace notes the "Borneo specimens seem to have rather acuter and more falcate wings."

Piepers figures a female which he states may not be from Java but from S. E. Borneo. It agrees well with a Kinabalu female in the Sarawak Museum, except that the three orange spots of the hind-marginal border of the hind-wing are more pronounced in Piepers' figure.

(*b*) *Appias nero flavius,* Grose-Smith.

Taganac Isles, off the East coast of North Borneo.

Differs from the typical Bornean form in lacking the fuscous scales on the veins.

573. *Appias pandione,* Hubner.

Hyposcritia pandione, Hubner, Zutr. Exot. Schmett., fig. 651-2, ♂, 1832.
Tachyris pandione, Wallace, Trans. Ent. Soc. Lond., p. 381, 1867.
Appias whiteheadi, Grose-Smith, Ann. Mag. Nat. Hist. (5) XX, p. 434, 1887. *Id.,* Rhop. Exot. I, p. 5, pl. II, (Pier.), figs. 4. 5 ♂, 1889.
Hyposcritia whiteheadi, Butler, Ann. Mag. Nat. Hist. (7) II, p. 393, 1898.
Appias pandione whiteheadi, Fruhstorfer, Seitz Macrolep., p. 153, 1910.

Three distinct geographical races make up this species; the typical form is found in Java, with a sub-species in Sumatra and another confined to Kinabalu.

(a) *Appias pandione whiteheadi,* Grose-Smith.

Mt. Kinabalu, 2500-3500 ft. (Sar. Mus.). Fairly plentiful in September. In Sumatra *pandione* is taken all the year round.

574. *Appias albina,* Boisd.

Pieris albina, Boisduval, Spéc. Gén. Lep. i. p. 480, 1836.
Pieris neombo, Boisduval, *l.c.* p. 559, 1836.
Tachyris neombo, Druce, Proc. Zool. Soc. Lond., p. 355, 1873.
Appias albina, Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 271, 1887.
Catophaga albina, Butler, Ann. Mag. Nat. Hist. (7) II, p. 397, 1898.
Appias albina neombo, Fruhstorfer, Seitz, Macrolep., p. 155, pl. 60, d ♀, 1910.

This species ranges from India to Malaya as far as the Philippines and Moluccas.

(a) *Appias albina neombo,* Boisduval.

Mt. Kinabalu, about 3000 ft. (Sar. Mus.).

This sub-species is restricted by Fruhstorfer to the Malay Peninsula, Java, Sumatra and Borneo, but some of the female forms appear to be exactly the same in Ceylon, Palawan, etc.

Three males, one white female and one yellow female (♀ form *flava* Röber) were taken from September 11th-28th 1913 on Mt. Kinabalu. This last agrees exactly with Fruhstorfer's figure (named *neombo* ♀ in plate). The white female is very close to his females of *galathea* and *confusa* (named in plate *darada*) but differs in having the fuscous region at the base of the fore-wing above a little less developed. There is a white pearly sheen on this specimen as in the males taken with it on Kinabalu.

575. *Appias melania,* Fab.

Papilio melania, Fabricius, Syst. Ent., p. 475, 1775.
Papilio paulina, Cramer, Pap. Exot. II, pl. CX. E, F, 1779.
Catophaga leis, Hubner, Zutr. Ex. Schmett. f. 771, 772, 1832.
Pieris agave, Felder, Wien Ent. Monat. VI, p. 286, 1862.
Tachyris alope, Wallace, Trans. Ent. Soc. Lond., p. 372, 1867.
Appias leis, Distant, Rhop. Malay., p. 313, pl. XXV, figs. 7, ♂, 6 and 10 ♀ vars, 1887.
Appias leis, Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 271, 1887.
Tachyris agave, Pagenstecher, Abhandl. d. Senckenb. Naturf. Ges. XXIII, p. 377, 1897.
Catophaga agave, Butler, Ann. Mag. Nat. Hist. (7) II, p. 395, 1898.
Appias melania athena, Fruhstorfer, Seitz Macrolep., p. 155, pl. 61 b ♀, 1910.

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1. Fruhstorfer places *galathea* Felder, as a form of *melania* and remarks that " the female appears to be still unknown, for what Moore figures as such in Lep. Ind. VII. t. 553, belongs to *albina* and its ♀—ab. *semiflava.*" Presumably the same remark also applies to Fruhstorfer's figure of *galathea* female!!

Distribution: Burma and Philippines south to Australia and New Caledonia.

(*a*) *Appias melania athena*, Fruhstorfer.

Mt. Kinabalu, Limbang, Mt. Matang, Quop and Kuching (Sar. Mus.).

This sub-species is confined to North Borneo and Sarawak.

Distant comments on the variation shown in a series from North Borneo. The Sarawak museum series bears this out; both males and females vary in the development of the black markings above. On the underside three females from Kinabalu and one from Matang have the heavy hind-marginal border to the hind-wing below and the apex of fore-wing below dark violaceous fuscous, while in one from Kinabalu and in one from Kuching this dark colouring is practically absent. There appear to be no intermediates, so the former might be regarded as the typical female form and for the latter I propose the name *ochracea*.

576. *Appias leptis*, Felder.

Pieris leptis, Felder, Reise, Nov. Lep. II, p. 163, 1865.
Tachyris leptis, Wallace, Trans. Ent. Soc. Lond., p. 373, 1867.
Tachyris leptis, Druce, Proc. Zool. Soc. Lond., p. 355, 1873.
Appias plana, Butler, Trans. Linn. Soc. (2), Zool. I, p. 551, 1879.
Appias leptis, var. *plana*, Distant, Rhop. Malay., p. 314, pl. XXV, fig. 9 ♀, 1885.
Appias leptis, var. *plana*, Distant, and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 272, 1887.
Hyposcritia plana, Butler, Ann. Mag. Nat. Hist. (7) II, p. 393, 1898.
Appias leptis aemilia, Fruhstorfer, Seitz Macrolep., p. 157, 1910.

Distribution: Malay Peninsula, Sumatra, Nias, Borneo, Palawan, Java, Bali and Lombok.

(*a*) *Appias leptis plana*, Butler.

Mt. Kinabalu, Limbang, Malinau, Matang, Mt. Santubong, Quop, Busau, Kuching (Sar. Mus.). Exp. al. ♂ 50-63 mm. ♀ 52-58 mm.

This sub-species also occurs in the Malay Peninsula and Sumatra.

Fruhstorfer separates the Bornean form from *plana* because "the white sub-apical spots of the fore-wing are smaller and the black sub-apical band is wider." The Sarawak specimens are variable in these two features, some examples having larger white spots than in *plana* figured by Fruhstorfer, others having them smaller. The same applies to the black sub-apical band. Wallace notes that his "specimen from Borneo is rather larger than the type from Java, and has a narrow black border only near the outer angle of the lower wings."

577. *Appias cardena,* Hew.

Pieris cardena, Hewitson, Exot. Butt. Vol. II. Pieris III. Nos. 17, 18, p. 7, pl. IV, 1860.
Pieris hagar, Vollenhoven, Mon. Pier., p. 38, pl. 4, fig. 6, ♂, 1865.
Tachyris cardena, Wallace, Trans. Ent. Soc. Lond., p. 363, 1867.
Tachyris cardena, Druce, Proc. Zool. Soc. Lond., p. 355, 1873.
Appias cardena, Distant, Rhop. Malay., p. 316, pl. XXXIII, fig. 3, ♂ 1885.
Appias cardena, Fruhstorfer, Seitz Macrolep., p. 157, pl. 60, b, ♂ and ♀, 1910.

Mt. Kinabalu, Mt. Selinguid 4850 ft., Limbang, Mt. Matang 3200ft., Mt. Santubong 2700 ft. (Sar. Mus.).

This species is confined to the Malay Peninsula, Sumatra and Borneo. Fruhstorfer[1] separates these in each country as sub-species, but the variation in a series of Sarawak males embraces the few small points of difference and thus indicates that separation is unnecessary.

Wallace notes "my specimens are intermediate between Hewitson's and Vollenhoven's figures, and I have no doubt but that they represent one rather variable species." Distant notes that this remark exactly applies to a Perak specimen examined and figured by him.

578. *Appias panda,* Godart.

Pieris panda, Godart, Encyc. Méth. IX, p. 147, 1819.
Pieris nathalia, Felder, Wien Ent. Monat. VI, p. 285, 1862.
Tachyris nathalia, Wallace, Trans. Ent. Soc. Lond., p. 369, 1867.
Tachyris nathalia, Druce, Proc. Zool. Soc. Lond., p. 355, 1873.
Saletara nathalia, Distant, Rhop. Malay., p. 317, pl. XXVI, figs. 1, ♂, 2, ♀, 1885.
Saletara nathalia, Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 272, 1887.
Tachyris nathalia, Pagenstecher, Abhandl. d. Senckenb. Naturf. Ges. XXIII, p. 377, 1897.
Saletara distanti, Butler, Ann. Mag. Nat. Hist. (7) II, p. 400, 1898.
Saletara panda distanti, Fruhstorfer, Seitz Macrolep., p. 182, 1910.

Distribution: Malay Peninsula, Nicobars, Nias, Sumatra, Billiton, Java, Borneo, Philippines and Celebes.

(*a*) *Appias panda distanti,* Butler.

North Borneo (Pryer); Limbang, Santubong, Kuching (Sar. Mus.).

This form is also found in the Malay Peninsula and Sumatra.

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[1] The Bornean forms figured by this author appear to be nearly always from British North Borneo and taken by themselves often suggest slight, but constant, differences from Sumatra and Malay Peninsula forms. Sarawak specimens however often show intermediate stages linking up the three, as in this and the last species.

Distant places this species in a separate genus on the structural characters of the sub-costal nervules of the fore-wing. He notes the variability of this feature, which is further commented on by Butler and is borne out by a series of Sarawak specimens in which there are 5 males with the 4th sub-costal present, one with it present in one wing, but absent in the other. One female has this nervule, the other males and females lack it, as described by Distant for *panda* in contradistinction to *nathalia*. Such an unstable feature seems insufficient to warrant generic distinction, therefore it is better to regard the species of this section as forming only a sub-genus of *Appias*, *i.e.* "a genus in the making." There are two Sarawak females with yellow hind-wings; one of them has the 4th sub-costal nervule noted above. The others are whitish like the males, but faintly tinged with pale lemon-yellow.

Genus, UDAIANA, Distant.

579. *Udaiana cynis*, Hewitson.

Pieris cynis, Hewitson, Exot. Butt. III. Pier., pl. 8, fig. 54, ♂, 1866.
Udaiana pryeri, Distant, Rhop. Malay., p. 301, ♂, 1885.
Udaiana pryeri, Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 270, 1887.
Udaiana androides, Hagen, Iris, VII, p. 32, 1894.
Udaiana cynis, de Nicéville, Journ. As. Soc. Beng. LXIV, p. 494, 1895.
Udaiana cynis pryeri, Fruhstorfer, Seitz' Macrólep., p. 183, pl. 62, c, ♂, 1910.

Udaiana is a monotypic genus confined to the Malay Peninsula (Mt. Ophir), Sumatra and Borneo. The Bornean forms, separated by Fruhstorfer as *pryeri*, Dist., are rather darker, with the basal area of hind-wing in male below more broadly green.

North Borneo (Sar. Mus.). Not known in Sarawak or Dutch Borneo.

The females in the Sarawak Museum differ from the *cynis* form in the greater development of fuscous colouring, which leaves only a small white discal patch in the hind-wing above; the two white spots between the median nervules in the fore-wing above are smaller in these Bornean females. A light ♀ form in the Malay Peninsula and Sumatra is named *androides*.

Pryer notes it as "abundant around bushes on river-banks." De Nicéville and Martin record the three forms taken together in Sumatra and for this reason keep them together as one species.

Genus, IXIAS, Hübn.

580. *Ixias undatus*, Butler.

Ixias undatus, Butler, Proc. Zool. Soc. Lond., p. 252, pl. 19, fig. 4, ♂, 1871.
Ixias undatus, Druce, Proc. Zool. Soc. Lond., p. 356, 1873.
Thestias pyrene, Kirby, Cat. Diurn. Lep. Coll. Hew., p. 32, 1879.
Ixias pyrene undatus, Fruhstorfer, Seitz Macrolep., p. 159, pl. 71, b, ♂, 1910.
Ixias undatus, Rothschild, Novit. Zool. XX, p. 279, ♀, 1913.

Mt. Kinabalu, Limbang, Malinau, Kuching (Sar. Mus.).

A local species, fairly plentiful in the upper waters of the Limbang River. The female is very rare and has only recently been described, though the male has been known for over 40 years.

Rothschild notes that the female "on the underside is quite unlike any other *Ixias*, and is in appearance a mimic of *Prioneris cornelia* Vollh."

Genus, DERCAS, Doubld.

581. *Dercas gobrias*, Hew.

Gonepteryx gobrias, Hewitson, Trans. Ent. Soc. Lond., p. 246, pl. XVI, fig. 1, ♂, 1864.
Rhodocera gobias, Vollenhoven, Mon. Pier., p. 63, 1865.
Dercas gobrias, Wallace, Trans. Ent. Soc. Lond., p. 398, 1867.
Dercas gobrias, Druce, Proc. Zool. Soc. Lond., p. 356, 1873.
Dercas gobrias, Distant, Rhop. Malay., p. 308, pl. XXVI, fig. 18, ♂, 1885.
Dercas gobrias, Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 271, 1887.
Dercas gobrias, Fruhstorfer, Seitz, Macrolep., p. 161, pl. 67 e, ♀, 1910.

The males of this species are not uncommon in many places in Borneo up to 3000 ft. Only one female in the Sarawak Museum, agreeing well with Wallace's description.

Vollenhoven records two males in the Leiden Museum taken by Mons. Diard in Borneo.

Distribution: Malay Peninsula, Sumatra, Nias and Borneo. In Sumatra the female is yellow like the male. Fruhstorfer records one example (*herodorus*) from Java.

Genus, CATOPSILIA, Hübn.

In placing *crocale* and *catilla* as one species we have only two species of this genus in Borneo which may be distinguished thus:—

1 No irrorations on underside .. .. CROCALE.
1^1 Small brownish transverse irrorations on underside of both wings .. .. PYRANTHE.

It is curious that no record for Borneo apparently exists of the Indo-Malayan species *C. scylla*, which should be easily recognized by its orange-yellow hind-wings.[1]

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1. In reply to my inquiries about this, Mr. N. D. Riley of the British Museum, neither is he able to find any reference to its capture in Borneo. Herr Fruhstorfer also informs me that he knows of none from Borneo.
Herr Fruhstorfer also informs me that he knows of none from Borneo.

582. *Catopsilia crocale*, Cram.

Papilio crocale, Cramer, Pap. Exot. i, pl. 55, figs. C, D, ♀, 1775.
Papilio pomona, Fabricius, Syst. Ent., p. 479, 1775.
Papilio catilla, Cramer, Pap. Exot. iii, pl. 229, figs. D, E, ♀, 1781.
Callidryas hilaria, Vollenhoven, Mon. Pier., pp. 60, 61, 1865.
Callidryas alcmene, Vollenhoven, *l.c.*
Callidryas alcmeone, Wallace, Trans. Ent. Soc. Lond., p. 400, 1867.
Callidryas hilaria, Wallace, *l.c.*
Callidryas crocale, Butler, Lepid. Exot., p. 22, pl. IX, figs. 1, 2, 3, 6, 1869.
Callidryas catilla, Butler, *l.c.* p. 24, pl. IX, figs. 7 to 10, 1869.
Callidryas crocale, Druce, Proc. Zool. Soc. Lond., p. 355, 1873.
Callidryas catilla, Druce, *l.c.*
Catopsilia crocale, Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 270, 1887.
Catopsilia catilla, Distant and Pryer, *l.c.*

A common species in Borneo. The *crocale* form of male appears to be the more common. On Kinabalu in August and September, 1913, only *crocale* males and only *pomona* females were taken. At Lawas in August 1909 a male and female of the typical *crocale* form were taken *in cop.*

The male form *flavescens*, Fruhst., and the female form *crocale* are rare in Sarawak. Two females from Kinabalu have the large brown patches on both wings beneath characteristic of the *catilla* form. This form is very rare in Sarawak.

In regard to the old question of uniting or separating the two forms we may notice the following recent opinions: de Nicéville[1] in his list of Sumatran Butterflies writes that he has bred both species from found larvae and that he failed to find any difference in larva and pupa; he therefore unites the two as one species. Dr. Martin, his co-author[2], however, separates them on various characters, *e.g.* *Catilla* is a forest insect with red antennæ, *crocale* has black antennæ and occurs in abundance, the larvae doing enormous damage to cultivated land.

Fruhstorfer[3] writes, "for the sake of simplicity we follow here the majority of entomologists and treat *pomona* as a separate species." Capt. W. H. Evans[4] in his Indian list also treats them as distinct, noting that "Mr. Bell has proved that these two species have distinct larvæ." The said Mr. Bell, however, in his last paper (published Dec. 20th 1913) writes "These two forms are so close together and grade so completely into each other in both sexes that it is impossible to separate them absolutely."

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1. *Journ. As. Soc. Beng.* LXIV, p. 490, 1895.
2. *Id.* p. 491.
3. *Seitz, Macrolepidopt.* IX, p. 163, 1910.
4. *Journ. Bomb. Nat. Hist. Soc.* XXI, p. 979, 1912.
5. *Journ. Bomb. Nat. Hist. Soc.* XXII, p. 520, 1913.

The Sarawak series bears this out, so we side with the "lumpers" and treat the two forms as one variable species.

583. *Catopsilia pyranthe,* Linn.

Papilio pyranthe, Linnaeus, Syst. Nat. X, p. 469, 1758.
Papilio chryseis, Drury, Ill. Exot. Ent. i, pl. 12, figs. 3, 4, ♂, 1773.
Catopsilia chryseis, Distant, Rhop. Malay., p. 300, pl. 25, figs. 1, 2, ♀, ♂, and pl. 26, fig. 20, ♀ var., 1885.
Catopsilia pyranthe, Fruhstorfer, Seitz Macrolep., p. 162, 1910.

Common in Sarawak.

Distribution: India, China and Formosa south to Malaya and Australia.

Genus, TERIAS, Swains.

Each writer on this genus proposes a new arrangement for the species contained in it, but until extensive breeding experiments are carried out no arrangement can be anything more than pure guess-work. Having no new facts to offer I follow Fruhstorfer's general arrangement with one or two exceptions which seem necessary from an examination of the Sarawak Museum specimens.

The two species or groups of species which occur in Borneo may be easily distinguished thus:—

1 Inner margin of fore-wing yellow .. .. .. HECABE-SARI.
1¹ Inner margin of fore-wing above with dark fuscous border .. .. TILAHA-RAHEL.

584. *Terias hecabe,* Linn.

Papilio hecabe, Linnaeus, Syst. Nat. X, p. 470, 1758.
Terias hecabe, Vollenhoven, Mon. Pier., p. 67, 1865.
Terias hecabe, Wallace, Trans. Ent. Soc. Lond., p. 325, 1867.
Terias hecabe, Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 270, 1887.
Eurema hecabe, Pagenstecher, Abhandl. d. Senckenb. Naturf. Ges., p. 378, 1897.
Terias nicobariensis, Butler, Ann. Mag. Nat. Hist. (7) I, p. 71, 1898.
Terias hecabe borneensis, Fruhstorfer, Seitz Macrolep., p. 167, pl. 73, e, ♂ and ♀, 1910.

Distribution of *hecabe* forms: Corea and Japan south to Australia.

The long series of the *hecabe-sari* forms in the Sarawak Museum I have divided up thus:—

1 Two irregular marks in cell of fore-wing beneath, either well-marked or very indistinct; apex of fore-wing below yellow or irregularly brown with some yellow near the apex, never uniformly brown; black margin in fore-wing above usually angulately excavate below costa and not obliquely excavate in its continuation from third to first median nervule.
  2 Basal marks in cell below prominent and well defined; apex of fore-wing brown below; cilia fuscous .. .. BORNEENSIS.

2^1 Basal marks in cell below obsolescent; apex of fore-wing below yellow never brown;
  3 Cilia of hind-wing yellow; expanse of wings 41-51 mm. .. .. HECABE.
  3^1 Cilia fuscous; expanse of wings 24-36 mm. .. SMALL VAR.
1^1 One distinct spot in cell of fore-wing beneath;
  2 Apex of fore-wing below quadrately uniform brown; black margin in fore-wing above evenly curved from costa to third median nervule, not angulate, and continued obliquely excavate. Hind-marginal border of hind-wing narrow, cilia fuscous. Expanse of wings 39-43 mm... .. .. .. SARI.
  2^1 Apex of fore-wing yellow below; black margin on fore-wing above not oblique from third to first median nervule. Expanse of wings 29-31 mm. .. LACTEOLA.

(*a*) ***Terias hecabe borneensis,*** Fruhstorfer.

Sarawak, up to 4800 ft., taken in January and March to October; no records for February, November or December.

Fruhstorfer describes the Bornean form of *hecabe* under this name:—"*borneensis* sub-sp. nov. has especially in the ♀ a strongly marked distal border." He figures the upperside of male and female which agree well with the Sarawak specimens as distinguished by this name in the foregoing key.

(*b*) ***Terias hecabe,*** forma typica.

Sarawak low-country, up to 3000 ft. on Kinabalu, taken in February, April, June to September and in December; no records for January, March, May, October or November. (Sar. Mus.).

There are four intermediates between this and the last in the Sarawak Museum; (i) a Kinabalu (Sept.) male with small but distinct cell spots and small pre-apical brown patch in fore-wing beneath; above with very narrow hind-marginal border to hind-wing, cilia yellow; (ii and iii) two females from Kuching district (April) referable to typical *hecabe* except for small pre-apical brown patch in fore-wing beneath, and (iv) a Kuching male (June) also referable to typical *hecabe* except for the colour of the cilia which is fuscous with only a yellow tinge at the anal angle.

(*c*) ***Terias hecabe,*** small var.

Sarawak low-country and Kinabalu 2500 ft., taken in April, May, July, August and November.

This may be Distant's *ada,* but he does not mention any spots in the cell of fore-wing below, so I follow Fruhstorfer in reserving that name for the Bornean form of *lacteola* (which by the way is also described and figured by Distant without cell spots in fore-wing beneath); Fruhstorfer places it in the *sari* group, characterized by one spot at the base of cell.

The wet and dry seasons are not very marked in Borneo and the months in which these three forms have been taken do not suggest any separation on account of seasonal differences. In general lines *hecabe* in Borneo appears to be dimorphic, with a tendency however to produce a dwarf race and an occasional intermediate.

Fruhstorfer separates *blanda* Boisd. as a another species distinguished by three cell marks instead of two. He describes several sub-species from Indo-Malayan countries and suggests that *snelleni* Moore from the Malay Peninsula and Sumatra probably occurs in Borneo. I can find none among the Sarawak specimens of *Terias*. Druce records in Borneo *T. silhetana* which is now regarded as the Assam and Sikkim form of *T. blanda*. Perhaps it is best omitted from our list until more definite information is available.

585. ***Terias sari,*** Horsfield.

Terias sari, Horsfield, Cat. Lep. E. I. C., p. 136, 1829.
Terias sari, Wallace, Trans. Ent. Soc. Lond., p. 326, 1867.
Terias sari, Druce, Proc. Zool. Soc. Lond., p. 354, 1873.
Terias sodalis, Moore, Journ. Linn. Soc., Zool. XXI, p. 45, 1886.
Terias sari, Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 271, 1887.
Terias sari obucola, Fruhstorfer, Seitz Macrolep., p. 170, 1910.

Limbang and Kuching, taken from April to June (Sar. Mus.). Apparently rare in Sarawak or perhaps passed over in mistake for *hecabe.*

Fruhstorfer separates the form from Borneo, Natuna and Palawan as *obucola,* having " still broader black-brown margins on the hind-wing." One of the Sarawak specimens agrees with Moore's figure of *sodalis* (*kana*)[1], two others have the margin very slightly broader. The width of this border is notoriously variable in *Terias* species, so the introduction of a new name on such a character seems unnecessary.

Distribution: India, Ceylon to Malay Peninsula, Greater Sunda Isles and Philippines. Wallace gives in addition, Flores, Timor and Australia.

586. ***Terias lacteola,*** Dist.

Terias biformis, Butler, *op. cit.* (7) I, p. 71, 1898.
Terias lacteola, Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 271, 1887.
Terias ada, Distant and Pryer, *l.c.* p. 271, 1887.
Terias biformis, Butler, *op. c.* (7) I, p. 71, 1898.
Terias lacteola ada, Fruhstorfer, Seitz Macrolep., p. 170, pl. 73 d, ♀, 1910.

Type of *lacteola* from Singapore. Distant and Pryer record it from North Borneo as " common in some places " and describe *T. ada* from the same district. Fruhstorfer confines

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[1] *Lepidopt. Indica* Vol. VII, pl. 573, 1 d, 1 e, 1905-1910.

lacteola to Siam, Annam and the Malay Peninsula and regards *ada* as the Bornean form of it, with other sub-species in Palawan, Natunas, Sumatra and Java.

Having no reason to doubt Distant's identification of his own species (*lacteola*), it appears that both *lacteola* and *ada* occur together in Borneo and that the former therefore should be regarded as a dimorphic species, and possibly, as Fruhstorfer suggests, only an extreme form of *sari*.

(*a*) Form *ada*, Distant.

Mt. Santubong, 2700 ft. (Sar. Mus.).

The two specimens I have referred to this form have the single cell-spot as in *sari*, but differ from that species in lacking the brown apical patch in fore-wing below, in the general paler yellow colouring and smaller size (*exp. al.* 29-31 mm.).

587. *Terias tilaha*, Horsf.

Terias tilaha, Horsfield, Cat. Lep. E. I. C., p. 136, 1829.
Terias tilaha, Vollenhoven, Mon. Pier., p. 65, 1865.
Terias tilaha, Wallace, Trans. Ent. Soc. Lond., p. 326, 1867.
Terias tilaha, Druce, Proc. Zool. Soc. Lond., p. 354, 1873.
Terias gradiens, Butler, Ann. Mag. Nat. Hist. (5) XVII, p. 223, pl. V, fig. 9, 1886.
Terias tilaha, Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 270, 1887.
Terias gradiens, Butler, *op. cit.* (7) I, p. 78, 1898.
Terias tilaha, Butler, *l.c.* p. 79, 1898.
Terias tilaha gradiens, Fruhstorfer, Seitz Macrolep., p. 170, 1910.

Sarawak: Kuching and Simunjan (Sar. Mus.).

Distribution: The Greater Sunda Isles and Sulu Archipelago. Vollenhoven records it also from Celebes.

In the Sarawak series there are, (i) a pair in which the ground-colour is light-yellow (= the Javan form, *tilaha*), (ii) two males with narrow hind-marginal border to the hind-wing and narrow inner-marginal border to the fore-wing grading into broader margined examples (= *gradiens*). Nearly all the females show the distal margin broader than in the male (= the Sumatra form, *nicévillei*). On these grounds it appears inadvisable to split up a variable species into badly defined sub-species.

588. *Terias rahel*, Fab.

Papilio rahel, Fabricius, Mant. Ins. ii. p. 22, 1787.
Terias alitha, Kirby, Cat. Diur. Lep. Coll. Hew., p. 30, 1879.
Terias rahel, Holland, Proc. Bost. Soc. Nat. Hist. XXV, p. 76, 1890.
Eurema tilaha, Pagenstecher, Abhandl. d. Senckenb. Naturf. Ges. XXIII, p. 378, 1897.
Terias rahel, Butler, Ann. Mag. Nat. Hist. (7) I, p. 79, 1898.
Terias tominia horatia, Fruhstorfer, Seitz Macrolep., p. 171, pl. 73 g, ♂ and ♀, 1910.

Sarawak: Simunjan, Tegora, Quop (Sar. Mus.); Pontianak, South Borneo[1] (Fruhstorfer). Kirby records eight specimens of *T. alitha* in the Hewitson collection from Borneo and Makian. Probably the Bornean specimens should be referred to *rahel.*

The Sarawak specimens agree well with Fruhstorfer's figures of *horatia.* A pair from Simunjan have light yellow ground-colour as in the pair of *tilaha* noted above; the others are darker yellow as in normal *tilaha.*

Fruhstorfer writes that the diagnosis of Fabricius is inadequate to recognize *rahel,* hence his introduction of the new name *horatia.* However, until proof is forthcoming that these specimens are *not* the *rahel* of Fabricius I prefer to retain this old name for the form which has long been known as such.

In Celebes occurs a very similar form, which may be regarded as a sub-species of *rahel;* this is *tominia,* Vollenhoven, with several local races, of which the typical form from North Celebes and *battana,* Fruhst. from South Celebes are perhaps most like the Bornean *rahel.* Holland however notes that "they (*tondana* [= *tominia*] and *rahel*) are abundantly distinct.... The absence in *Rahel* of the sex mark on the under surface of the primaries, which is so conspicuous in *Tondana,* is alone sufficient to distinguish them.........." Pagenstecher, on the other hand has treated *tilaha*[2], *tominia* and *tondana* as one species.

The curious distribution of this species (*viz.* Borneo and Celebes) may perhaps be explained if *rahel* turns out to be only the darkened form of *tilaha.*

In Sarawak it is rare, and the absence of records of it from North or East Borneo rather supports this suggestion. Thus, as a darkened form of *tilaha* it may be regarded as obsolescent in Borneo, giving way before the lighter form (= typical *tilaha*), but persistent in Celebes where the lighter form never occurred or perhaps has since died out. In many species in Celebes there is a tendency to melanism; in this particular group of *Terias* we may mention as instances, *mangolina,* Fruhst., *zita,* Feld. and *exophthalma,* Fruhst.

Genus, GANDACA, Moore.

589. *Gandaca harina,* Horsf.

Terias harina, Horsfield, Cat. Lep. E. I. C., p. 137, 1829.
Terias harina, Wallace, Trans. Ent. Soc. Lond., p. 320, 1867.
Terias harina, Druce, Proc. Zool. Soc. Lond., p. 354, 1873.

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[1] Pontianak is on the Equator in West Borneo.

[2] Pagenstecher remarks of the Bornean specimen that it has "beinahe schwarze Vorderflugel, die nur in Discus gelb angeflogen sind," so I place it under *rahel* rather than with *tilaha,* Horsfield.

Terias harina, Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 271, 1887.
Eurema harina, Pagenstecher, Abhandl. d. Senckenb. Naturf. Ges. XXIII, p. 378, 1897.
Gandaca harina elis, Fruhstorfer, Seitz, Macrolep., p. 173, 1910.

Sarawak: Limbang, Mt. Selinguid, 4800 ft., Santubong, Tegora, Bau, Kuching (Sar. Mus.).

Distribution: Sikkim, Hainan and the Philippines south through Malaya to New Guinea.

Fruhstorfer separates the Bornean forms as *elis* sub-sp. nov., which he describes from North Borneo as having "a white ♀ with strikingly broad, strongly dentate border on the fore-wing."

A Kuching female shows absolutely no trace of dentation in the distal border, in others the only fuscous projection from the hind-marginal border is on the 3rd median nervule, in two others this border is certainly more dentate. The width is variable. In the males this fuscous border is also variable.

Genus, HEBOMOIA, Hübn.

590. ***Hebomoia glaucippe***, Linn.

Papilio glaucippe, Linnaeus, Syst. Nat. X, p. 469, 1758.
Iphias glaucippe, Vollenhoven, Mon. Pier., p. 52, 1865.
Iphias borneensis, Wallace, Trans. Ent. Soc. Lond., p. 396, 1867.
Hebomoia borneensis, Druce, Proc. Zool. Soc. Lond., p. 356, 1873.
Hebomoia glaucippe, Kirby, Cat. Diurn. Lep. Coll. Hew., p. 32, 1879.
Hebomoia borneensis, Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 272, 1887.
Hebomoia borneensis, Fruhstorfer, Seitz Macrolep., p. 176, pl. 70, d, ♂, 1910.

Distribution: India, China and the Philippines south to the Moluccas.

(a) ***Hebomoia glaucippe borneensis***, Wallace.

The males are not uncommon in Sarawak and on Kinabalu up to 3000 ft., but the females are particularly rare.

The Sarawak males show little variation in size or colouring. The four spots in the orange pre-apical patch of the fore-wing above are clear in some specimens, but in others, the upper, or lower, or both, are fused with the fuscous apical border. In the hind-wing a few dark hind-marginal spots are irregularly developed, in one absent altogether, in another there are faint signs of a post-discal row.

Vollenhoven writes that it is not rare in Borneo and that "les plus petits sont ceux de Java et de Borneo."

De Nicéville notes that "the Sumatran race is identical with the Bornean one;" Fruhstorfer, however, states that "*sumatrana* Hagen has the proximal black bordering of the orange spot considerably narrower than in *borneensis*, the apical spot itself broader, adorned with somewhat larger wedge-spots."

Genus, PARERONIA, Bingham.

591. *Pareronia valeria*, Cramer.

Papilio valeria, Cramer, Pap. Exot. I, pl. 85, fig. A, ♂, 1779.
Eronia valeria, Vollenhoven, Mon. Pier., p. 56, 1865.
Eronia valeria, Wallace, Trans. Ent. Soc. Lond., p. 388, 1867.
Eronia valeria, Druce, Proc. Zool. Soc. Lond., p. 355, 1873.
Nepheronia lutescens, Butler, Cist. Ent. II, p. 431, 1879.
Eronia valeria, Kirby, Cat. Diurn. Lep. Coll. Hew., p. 32, 1879.
Nepheronia valeria, Distant and Pryer, Ann. Mag. Nat. Hist. (5) XIX, p. 272, 1887.
Nepheronia lutescens, Distant and Pryer, *l.c.*
Eronia valeria, Pagenstecher, Abhandl. d. Senckenb. Naturf. Ges. XXIII, p. 380, 1897.
Pareronia valeria lutescens, Fruhstorfer, Seitz Macrolep., p. 178, pl. 66 c, ♂ and ♀, 1910.

(*a*) *Pareronia valeria lutescens*, Butler.

Mt. Kinabalu up to 5000 ft., Limbang, Kuching, Quop (Sar. Mus.).

Wallace notes "the Bornean males have rather more elongate fore-wings, with a slightly concave outer margin." Vollenhoven draws attention to the possibility of separating the Bornean form.[1] Distant and Pryer record, without comment, both *valeria* and *lutescens* in their list for North Borneo. Pagenstecher writes "Die hinterflügel zeigen bei einen von Borneo (Samarinda) vorliegenden Exemplare auf der Oberseite weit mehr Gelb, die Unterseite derselben ist verwaschen am Aufsenrande und am Grunde mit stärkerem gelblichem Anflug."

SUB-FAMILY 2. PAPILIONINÆ.

The standard work on the Oriental species of this sub-family is that of Rothschild and Jordan published in *Novitates Zoologicæ* Vol. II. 1895,[1] and now brought up to date by the latter author in Seitz's *Macrolepidoptera of the World*, 1908-1909. As these authors have so carefully studied the complete synonymy of these butterflies it is unnecessary to quote numerous references to other works, so in the following pages—with few exceptions,—only

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1. "Le type se trouve en Java, Sumatra, Banca et Borneo, la variété dans cette dernière ile et sur le continent Indien, où la forme que nous avons décrite comme le type, semble ne pas se rencontrer. Horsfield soulève donc la question si ces deux formes ne seraient pas deux espèces distinctes."

2. "A Revision of the Papilios of the Eastern Hemisphere excluding Africa." (*Novitat. Zoolog.* II, pp. 165-463, 1895).

three references are given: first to the original descriptions and figures, then to the 1895 "Revision" and lastly to Seitz's *Macrolepidoptera of the World.*

Forty-three species are recognized in the present paper from Borneo. Former writers on Bornean butterflies give the following numbers: Wallace (1865) in his historic memoir on the Papilios of the Malayan region allows 29 for Borneo. Druce (1873) gives 30, many of which are not allowed now. Distant and Pryer (1887) give 21. Pryer and Cator (1894) increase this to 50 and Bartlett (1896) to 61. The present reduction to 43 is due to the introduction of subspecific nomenclature and rather broader views as to varieties of one species. Thus although only 43 species are recognized here, we count some 70 different named forms, several of which originally passed as distinct species, but are now considered as aberrations, sexual forms or sub-species.

The following new names are proposed here:

No. 608. P. polytes theseus form ***ignea,*** form. nov.

No. 617. P. antiphates itamputi ab. ***aperta,*** ab. nov.

In regard to geographical distribution of Bornean Papilios, this will be treated in detail on some future occasion. Here we may briefly note one or two points of interest. Of our 43 species occurring in Borneo, only 4 are peculiar to the country, though we might add several sub-species, which, though very similar and closely allied to forms in neighbouring countries, are nevertheless peculiar to Borneo. However, if we treat the term "species" in its broader, more up-to-date sense we have only four peculiar to Borneo. Of the remainder, 35 are found in Sumatra, 33 in the Malay Peninsula, but only 25 in Java, the majority of which are wide-ranging species found from India to Australia.

The above figures show very clear the close relationship between the Malay Peninsula, Sumatra and Borneo and the comparative isolation of Java. Wallace noted this in 1865 and it is of interest to record his actual words[1]:—

"An examination of the relations of the species of the adjacent islands will thus enable us to correct opinions formed from a mere consideration of their relative positions. For example, looking at a map of the archipelago, it is almost impossible to avoid the idea that Java and Sumatra have been recently united; their present proximity is so great, and they have such an obvious resemblance in their volcanic structure. Yet there can be little doubt that this opinion is erroneous, and that Sumatra has had a more recent and more intimate connexion with Borneo than it has had with Java. This is strikingly shown by the mammals of these islands—very few of the species of Java and Sumatra being identical, while a considerable number are common to Sumatra and Borneo. The birds show a somewhat similar relationship;

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[1] Trans. Linn. Soc. Lond. XXV, p. 29, 1865.

and we shall find that the group of insects we are now treating of tells exactly the same tale. Thus:—

Sumatra	.. 21 sp.	20 sp. common to both islands;
Borneo ..	.. 29 sp.	
Sumatra	.. 21 sp.	11 sp. common to both islands;
Java ..	.. 27 sp.	
Borneo ..	.. 29 sp.	20 sp. common to both islands;
Java ..	.. 27 sp.	

showing that both Sumatra and Java have a much closer relationship to Borneo than they have [to] each other—a most singular and interesting result when we consider the wide separation of Borneo from them both, and its very different structure."

Since Wallace wrote those lines, further collections abundantly corroborate his statement that Sumatra has a much closer relationship to Borneo than to Java, but the statement that Java too is closely related to Borneo in not borne out. From our knowledge to-day we can assert that Sumatra and Borneo, with the addition of the Malay Peninsula, present a very similar fauna indicating a close and recent relationship between the three countries, but that Java has been separated for a long time and now has a more generalized Indian fauna in addition to its specialized Javan fauna, while the three countries mentioned above are characterized by an essentially specialized Malayan fauna.

The two Papilionine genera occurring in Borneo may be distinguished thus:—

1 Expanse of wings: 70-190 mm. First subcostal nervule of fore-wing emitted nearer apex of cell than base .. .. PAPILIO.
1¹ Expanse of wings: 36-47 mm. First subcostal nervule of fore-wing emitted nearer base of cell than apex .. .. .. LEPTOCIRCUS.

In compiling the following key to the Bornean species of *Papilio* I have chosen superficial characters in preference to small differences in neuration, which do not appear very satisfactory.

1 Wings large, 120-190 mm.; cell of hind-wing above, with the exception of a small black basal portion, always green or yellow, which colour always extends above, beyond and below the cell. Fore-wing never with red basal spot. Hind-wings never tailed.
  2 Fore-wings abnormally long and narrow, hind-wings small. General colouring velvety black with prominent green serrated band from apex to inner margin and across hind-wing .. .. BROOKEANA.

2^1 Both wings normally broad. Ground-colour of fore-wing fuscous, of hind-wing yellow.

3 With red hairs on sides of thorax below .. .. HELENA CERBERUS.

3^1 Without red hairs.

4 Male with very noticeable blue sheen on fore-wing above .. MIRANDA.

4^1 Male without blue sheen.

5 Male without yellow (or faintest trace only) on fore-wing. Female fore-wing above greyish.

6 Female above white-grey ANDROMACHE.

6^1 Female above brown-grey ANDROMACHE MARAPOKENSIS.

5^1 Male with yellow vein-stripes in fore-wing. Female fore-wing above with basal half dark fuscous, outer half with broad grey vein-stripes .. AMPHRYSUS FLAVICOLLIS

1^1 Wings of moderate expanse, 70-115, rarely to 140 mm; cell of hind-wing usually fuscous, sometimes white; but if green, the apex of cell and beyond is fuscous; if yellow, the fore-wing has prominent red basal spot. Hind-wings sometimes tailed, sometimes not.

2 Fore-wing: vein 11 not anastomosed with 12.

3 Ground-colour of fore-wing fuscous, never green glossed or white. General pattern without band from apex of fore-wing to inner margin and across hind-wing, with one exception, in which the hind-wings have long spatulate tails.

4 No spots at base of wings below.

5 Hind-wings without yellow discal patch or band.

6 Red spots bordering the thorax below.

7 Both wings above uniform blue-black in male, fuscous relieved with light-grey vein-stripes in female; without tails or red spots on hind-wing.

8 Male fore-wing rather broad. Female vein-stripes yellowish-grey .. .. NOX NOCTIS.

8^1 Male fore-wing narrower. Female vein-stripes whitish NOX BANJERMASINUS.

7^1 With tails and red spots on hind-wing.

8 Terminal portion of abdomen yel-

low; red spots on hind-wing post-discal .. .. .. NEPTUNUS DORIS.

8^1 Terminal portion of abdomen not yellow; red spots on hind-wing below marginal above obsolescent .. ARISTOLOCHIAE ANTIPHUS.

6^1 White spots on thorax below and on patagia.

7 General colouring uniform brown fuscous, with a yellow spot at anal angle of hind-wing .. .. .. SLATERI HEWITSONI.

7^1 General colouring brown fuscous, with blue gloss on males, and usually with prominent white spot at end of cell in females. Hind-wing without yellow anal spot .. .. .. PARADOXA TELESICLES.

5^1 Hind-wings with yellow or yellow-green patch discally or post-discally. Tails to hind-wing.

6 A yellow-green band from apex of fore-wing to inner margin and across disc of hind-wing .. .. .. DEMOLION.

6^1 Broad pale yellow patch beyond cell in hind-wing.

7 Pale yellow apical band in fore-wing above.

8 Apical band of 5 or 6 oblong spots, pale yellow in the male, whitish in the female .. .. NEPHELUS ALBOLINEATUS.

8^1 Apical band reduced to 2 oblong spots with faint indication of a third NUBILUS.

7^1 Fore-wing uniform fuscous-black; no yellow apical band.

8 Hind-wing below without trace of blue spots across the post-discal region; above with three yellow spots, sharply limited by the radial nervure HELENUS ENGANIUS.

8^1 Hind-wing below with narrow blue or bluish-white spots across the post-discal region; above with four yellow spots.

9 Hind-wing below without hind-marginal row of orange-red spots ISWARA ARASPES.

9^1 Hind-wing below with regular series of orange-red spots along the hind-margin FUSCUS DAYACUS.

5^2 Hind-wing with complete discal band of pale greenish-yellow spots (♂) or incomplete discal band of red spots (♀) .. .. .. POLYTES THESEUS.

4^1 Spots at base of hind-wing below.

5 Short ochreous band enclosing three black patches on hind-wing below towards anal angle .. .. ACHERON.

5^1 No ochreous spots on hind-wing below.[1]

6 Hind-wing tailed .. LOWI.

6^1 Hind-wing without tails.. MEMNON.

3^1 Fore-wings: with green or green-blue metallic gloss.

4 Fore-wings without green band KARNA CARNATUS.

4^1 Fore-wings with green median band .. .. PALINURUS.

3^2 Fore-wings: ground colour white; with dark fuscous bands across the cell and bordering the hind-margin.

4 Hind-wing above with red anal spot.

5 Light submarginal band in fore-wing much broader than black marginal border .. AGETES KINABALUENSIS.

5^1 Light submarginal band in fore-wing much narrower than black marginal border .. STRATIOTES.

4^1 Hind-wing above without red anal spot.

5 Hind-wing below with row of red spots from costa to inner margin .. .. .. ARISTEUS HERMOCRATES.

5^1 Hind-wing below without red spots.

6 Inner portion of black median band in hind-wing below continued well beyond apex of cell .. ANTIPHATES ITAMPUTI.

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1. Some of the female-forms of *memnon* have discal or post-discal region yellowish.

- 6^1 Inner portion of black median band in hind-wing below not extending beyond apex of cell .. EUPHRATES DECOLOR.

3^3 General pattern above consists of light coloured band on dark ground colour from apex of fore-wing to centre of inner-margin and across to inner margin of hind-wing
- 4 Fore-wings very hooked; a tawny orange band on brown-fuscous ground-colour. Hind-wing with long tails .. .. PAYENI BRUNEI.
- 4^1 Fore-wings slightly hooked; fore-wing with reduced band of greenish-yellow spots on grey-fuscous ground-colour. Discal region of hind-wing light-grey. Tails shorter .. .. .. EMPEDOCLES.
- 4^2 Green band on dark fuscous ground colour. Tails very short or absent altogether.
  - 5 Band across both wings; spots composing it for the most part confluent.
    - 6 Fore-wing above without hind-marginal row of green spots and without spots in cell .. .. SARPEDON.
    - 6^1 Fore-wing above with hind-marginal row of green spots and with spots in cell.
      - 7 Red spots in anal region of hind-wing. below.
        - 8 Short subcostal band bearing red spot not joining basal band on hind-wing below DOSON EVEMONIDES.
        - 8^1 Short subcostal band on hind-wing below joining basal band.
          - 9 No red spot near costa .. EVEMON ORTHIA.
          - 9^1 A red spot on the short subcostal band just below the costa .. .. EURYPYLUS MECISTEUS.
      - 7^1 Orange-yellow spots in anal region of hind-wing below.
        - 8 Short subcostal band on hind-wing below not joining basal band, nor

entering cell. Green band on fore-wing above larger .. .. PROCLES.
8^1 Subcostal band crossing cell running parallel to basal band, and joining the submarginal border BATHYCLES BATHYCLOIDES.
5^1 Band in both wings broken up into spots.
6 Hind-wing tailed .. AGAMEMNON.
6^1 Without tails .. .. ARYCLES.
2^1 Fore-wing, vein 11 anastomosed with 12. General pattern not banded, but with white internervular stripes on fuscous ground-colour[1] in mimicry of *Danais* or *Euploea*.
3 Abdomen with black median line on underside.
4 Hind-wing below without yellow spot.
5 Danaine mimic, with white stripes in fore-wing .. .. MACAREUS MACARISTUS.
5^1 Euploeine mimic, with uniform fuscous fore-wing .. LEUCOTHOE RAMACEUS.
4^1 Hind-wing below with yellow anal spot .. .. DELESSERTI.
3^1 Abdomen without black median line on underside .. .. MEGARUS.

Genus, PAPILIO, Linn.

592. *Papilio brookeana,* Wallace.

Ornithoptera brookiana, Wall. ♂, Proc. Ent. Soc. Lond., p. 104, 1855.
Ornithoptera brookiana, Hewitson, Exot. Butt. 1, 1856.
Ornithoptera brookeana, Hewitson, *l.c.* fig. 1. ♂.
Ornithoptera brookeana, Wall., Trans. Linn. Soc., Lond., p. 40, 1865.
Troides brookianus, Rothschild, Novitat. Zool. II, p. 198, 1895.
Papilio brookiana, Jordan, Seitz, Macrolep., p. 17, 1910.

Mt. Kinabalu up to 4500 ft., Lawas, Limbang, Kuching, Quop (Sar. Mus.). Not uncommon in many localities in Sarawak; usually prefers inland jungle and streams; occasionally to be seen feeding at wet places on rock or sand, but more often at flowers, or flying rapidly up and down half sunlit mountains and streams.

The typical form occurs in Borneo and the island of Balabac off the north coast. Closely allied geographical races are found in Perak, the Natunas and Sumatra. An allied species, *P. trojana,* Staud., is found in Palawan.

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[1] As Jordan states, no doubt the ground-colour is white, and the veins have the super-imposed fuscous scales; but for the purposes of this key—inevitably artificial—we may treat it as the reverse.

Although in Wallace's original description the name of this species is spelt with an 'i,' it seems unnecessary to perpetuate this mistake, as Wallace himself gives the heading "*Brookeana* group" and writes *Ornithoptera brookeana* in his paper on the Malayan Papilionidæ in 1865. Hewitson figures the species in 1856 as *brookeana*, but writes *brookiana* on the page of text facing his figure! And in a foot-note he writes untruthfully, "It has been named by Mr. Wallace, in compliment to Captain Brooke, the Rajah's brother."[1]

A curious aberration of the male from Kinabalu with grey-fuscous costal margin and patch of same colour at termination of the 3rd median nervule and radial in the hind-wing above, instead of the usual velvety black. In this specimen the fore-wing below has prominent white spots and those of the hind-marginal row in hind-wing below are large and continuous (the black veins alone separating them).

593. ***Papilio helena,*** Linn.

Papilio helena, Linn., Syst. Nat. (X), p. 461, 1758.
Papilio cerberus, Felder, Verh. Zool.-bot. Ges. Wien, p. 291, 1864.
Troides helena cerberus, Rothschild, *l.c.* p. 219, 1895.
Papilio helena cerberus, Jordan, *l.c.* p. 24, 1910.

Distribution: Hainan and North India through Malaya to New Guinea.

(*a*) ***Papilio helena cerberus,*** Felder.

Mt. Matang 3,200 ft., Samarahan, Quop (Sar. Mus.).

This sub-species occurs from Sikkim and Assam south through Burma and the Malay Peninsula to Borneo and the Natunas.

The Sarawak males show no variation; the females vary in the white edging to the veins of the fore-wing above, which in some is hardly noticeable, in others well developed. The double hind-marginal row of black spots also varies in development, in one all the spots of the inner row touch one another and are fused with the outer row, in others they are separated from one another but fused with the outer margin, and in others they are entirely separate. In size the females range from 126-172 mm.

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[1] Captain Brooke was the *nephew* of Sir James Brooke, and brother of the present Rajah, who succeeded on the death of Sir James Brooke in 1868. Captain Brooke died the same year. Wallace, however, dedicates the species to Sir James Brooke in these words, "'My specimen (kindly given me by Captain Brooke) came from the Rejang river; but I have myself once seen it on the wing near Sarawak. I have named it after Sir J. Brooke, whose benevolent Government of the Country in which it was discovered every true Englishman must admire.''

594. *Papilio miranda,* Butl.

Papilio miranda, Butler, Lep. Exot., p. 3, pl. I. ♂ and ♀, 1869.
Troides mirandus, Rothschild, *l.c.* p. 227, 1895.
Papilio miranda, Jordan, *l.c.* p. 26, pl. 14, b ♂, c ♀, 1910.

Distribution: Borneo and Sumatra.

(a) *Papilio miranda miranda,* Butler.

Sandakan (Pryer); Trusan and Limbang (Sar. Mus.).

The type form from Borneo only, with a closely allied sub-species, *neomiranda,* Fruhst., in Sumatra.

Described from Sarawak specimens collected by "Mr. Lowe" (presumably Sir (then Mr.) Hugh Low). Jordan states that it is "no rarity in the hilly country of North Borneo." Collecting in Sarawak does not bear this out.

595. *Papilio andromache,* Stdgr.

Papilio andromache, Staudinger, Iris, V, p. 393, 1892.
Troides andromache, Rothschild, *l.c.* p. 228, 1895.
Papilio marapokensis, Fruhstorfer, Berl. Ent. Zeit., p. 419, 1899.
Papilio andromache, Jord., *l.c.* p. 26, pl. 13, c ♂ and ♀, 1910.
Papilio andromache marapokensis, Jord., *l.c.* p. 26, 1910.

Confined to the mountains of North Borneo. The type form on Kinabalu, with a sub-species on Mt. Marapok.

(a) *Papilio andromache andromache,* Staudinger.

I saw the female of this sub-species flying slowly up the Minitindok gorge on Kinabalu, alt. 3,000 ft.; a few were taken in the neighbourhood, but no males.

(b) *Papilio andromache marapokensis,* Fruhstorfer.

Only known from the Marapok Mts. near Lawas.

596. *Papilio amphrysus,* Cr.

Papilio amphrysus, Cramer, Pap. Exot. III, p. 43, pl. 219, fig. A, 1782.
Ornithoptera flavicollis, Druce, Proc. Zool. Soc. Lond., p. 356, 1873.
Troides amphrysus flavicollis, Rothschild, *l.c.* p. 231, 1895.
Papilio amphrysus flavicollis, Jord., *l.c.* p. 28, 1910.

The species ranges over Sumatra, Java, Borneo and the Malay Peninsula, also occurring on the outlying islands of Banguey off the north coast of Borneo and on the islands off the west coast of Sumatra.

(a) *Papilio amphrysus flavicollis,* Druce.

Mt. Kinabalu, Trusan, Limbang, Baram, Kakus (Sar. Mus.)

This sub-species is confined to Borneo and Banguey Island. Two female forms are recognized.

(i) ♀ form *actinotia,* Jordan, is the dark form with outer end only of cell greyish.

(ii) ♀ form *olympia,* Honrath, is the light form with cell for the most part or entirely greyish.

The colouring of the collar is variable and yet further names are introduced by Fruhstorfer to note these variations. Thus the red-collared form of the male is called ab. *gardineri*, females with collar brownish are ab. *bruneicollis* and the black-collared form is ab. *nigricollis.* In many Sarawak specimens only the barest trace of a collar is visible and there are intermediates grading up to a well-defined yellow or red collar from none at all (*i.e.*, the whole head and thorax black).

Jordan states that the yellow-collared is the common form. This is not so in Sarawak, where red-collared species predominate, and only the female form *actinotia* has so far been brought to the Sarawak Museum. These vary greatly in size, the expanse of wings in one reaching 7½ inches, in another only 5¼ inches.

In the males the yellow vein-stripes vary in development, in some well-marked and long, in others obsolescent. The yellow scales at the end of the cell are absent in one specimen.

NOX-GROUP.

597. *Papilio nox*, Swains.

Papilio nox, Swainson, Zool. Ill., III, t. 102, ♀, 1822-3.
Papilio noctis, Hewitson, Proc. Zool. Soc. Lond., p. 423, pl. 66, figs. 5, 6, 1859.
Papilio noctula, Westwood, Trans. Ent. Soc. Lond., p. 90, pl. 4, fig. 3, ♂, 1872.
Papilio strix, Westwood, *l.c.* p. 92, pl. 4, fig. 4, ♀, 1872.
Papilio noctula, Rothschild, *l.c.* p. 259, and *P. noctis*, p. 260, 1895.
Papilio nox noctis, Jordan, *l.c.* p. 30, pl. 18 c, ♂ and ♀ and form *noctula*, pl. 18 b, ♂ and ♀, 1910.

Distribution: Malay Peninsula, Sumatra, Nias, Java, Bali and Borneo. The typical form occurs on Java only.

(a) *Papilio nox noctis*, Hewitson.

This sub-species is confined to North Borneo, where it occurs in two forms. The typical form has no yellow-grey vein stripes on the fore-wing below in the male. In the typical *noctis* female the yellowish-grey stripes on the hind-wing are merged together into a broad hind-marginal band.

(i) forma typica. Limbang, Baram, Mt. Lingga, Quop and Kuching (Sar. Mus.).
(ii) ♂ form *noctula*, distinguished by strong blue gloss above and yellow grey vein-stripes in fore-wing below. The female of this form is called *strix;* in it the veins of the hind-wing are striped with yellowish grey.

Kinabatangan, British North Borneo (Sar. Mus.).

(*b*) *Papilio nox banjermasinus*, Fruhstorfer.

Confined to South Borneo.

The fore-wing of the male is rather narrower then in *P. nox noctis*. The stripes in the female are whitish, not yellow-grey.

COON-GROUP.

598. *Papilio neptunus,* Guér.

Papilio neptunus, Guérin, Rev. Zool., p. 43, 1840.
Papilio neptunus, Rothschild, *l.c.* p. 255, 1895.
Papilio neptunus doris, Jordan, *l.c.* p. 33, 1910.

Distribution: Malay Peninsula, Sumatra, Nias, Borneo. The typical form comes from the Malay Peninsula.

(*a*) *Papilio neptunus doris,* Rothschild.

Limbang, Malinau, Banting and Kuching (Sar. Mus.).

Confined to North Borneo, but closely allied to the Malay Peninsula form *neptunus* and through that to the Sumatran form *sumatrana,* Hagen.

HECTOR-Group.

599. *Papilio aristolochiae,* Fab.

Papilio aristolochiae, Fabricius, Syst. Ent., p. 443, 1775.
Papilio acuta, Druce, Proc. Zool. Soc. Lond., p. 358, 1873.
Papilio antiphus, var. *periphus,* Oberthur, Etud. d'Entom, IV, pp. 43 and 113, 1879.
Papilio aristolochiae acutus and *antiphus,* Rothschild. *l.c.* p. 251, 1895.
Papilio aristolochiae antiphus, Jordan, *l.c.* p. 38.

Distribution: China, India, Ceylon, Malay Peninsula and Archipelago as far as Flores.

Typical form occurs in India.

(*a*) *Papilio aristolochiae antiphus,* Fab.

Mt. Kinabalu, Limbang, Satap, Quop, Kuching (Sar. Mus.).

This sub-species ranges from the Natunas, Nias and Sumatra to Borneo and Djampea.

Two varieties occur in Borneo:

(i) ab. *acuta,* Druce, black specimens with narrow tail. Lawas, Baram, Samarahan, Satap, Quop (Sar. Mus.).

(ii) ab. *periphus,* Oberthur, specimens with short tail.

AGESTOR-GROUP.

600. *Papilio slateri,* Hewitson.

Papilio slateri, Hewitson, Exot. Butt. II. Pap., pl. 4, fig. 9, 1859.
Papilio hewitsonii, Westwood, Proc. Ent. Soc. Lond., p. 10, 1864.
Papilio slateri hewitsoni, Rothschild, *l.c.* p. 363, 1895.
Papilio hewitsoni, Jordan, *l.c.* p. 42, pl. 20 b, 1909.

Distribution: North India to Sumatra and Borneo. Typical form from Sikkim and Assam.

(a) Papilio slateri hewitsoni, Westwood.

Limbang, Matang, Quop (Sar. Mus.).

Confined to Borneo, but hardly separable from the Malay Peninsula and Sumatra form, *perses,* de Nicéville.

A variety with white stripes on hind-wing is named *persides* Fruhstorfer. One from Quop and another from the summit of Mt. Matang show these white stripes slightly developed and therefore may be referred to this variety.

CLYTIA-GROUP.

601. Papilio paradoxa, Zink.

Zelima paradoxa, Zinken, Nov. Act. Ac. Nat. Cur., p. 162, pl. 15, figs. 9, 10, 1832.
Papilio caunus, Westwood, Cab. Or. Ent., pl. IX, fig. 2, 1848.
Papilio telesicles, Felder, Verh. Zool.-bot. Ges. Wien, pp. 308 and 355, 1864.
Papilio kerosa, Butler, Lep. Exot., p. 33, pl. XIII, fig. 2, ♂, 1870.
Papilio juda, Butler, *l.c.* p. 34, pl. XIII, figs. 3, 4, ♂ and ♀, 1870.
Papilio zanoa, Butler, *l.c.* p. 33, pl. XIII, fig. 1, ♂, 1870.
Papilio paradoxus telesicles, Rothschild, *l.c.* p. 372, 1895.
Papilio caunus mendax, Rothschild, *l.c.* p. 376, 1895.
Papilio paradoxus telesicles, Jordan, *l.c.* p. 44, pl. 20 b, ♂, 49 a, ♀ (*nec* 32 b), 32 a, ♀ (*nec* 32 c), 1909.

Distribution: North India through Malay Peninsula to Greater Sunda Isles and Palawan.

(a) Papilio paradoxa telesicles, Felder.

This sub-species occurs in Borneo only.

There are two groups of forms which until recently were looked upon as two distinct species, but Dr. Jordan now suggests that they really represent one.

1. *Paradoxa*-forms.

We have two forms of the male and four of the female.

(i) ♂ form *telesicles,* Feld.

Malinau, Matang, Satap, Quop, Kuching (Sar. Mus.).

Distinguished by the light blue discal stripes on fore-wing and hind-marginal row of white spots to both wings.

(ii) ♂ form *eucyana,* Jord.

North and South-east Borneo (Tring Mus.).

Discal stripes are absent and sub-marginal spots of fore-wing obsolescent.

(iii) ♀ form *leucothoides,* Honr.

Limbang and Kuching (Sar. Mus.); North and South-east Borneo (Tring Mus.).

Both wings brown; hind-marginal row of white spots in hind-wing above.

(iv) ♀ form *russus,* Rothsch.

Limbang and Kuching (Sar. Mus.); North Borneo (Tring Mus.).

Similar to last, but with the addition of white apical stripes and a white spot at end of cell. The four examples in the Sarawak Museum have five white apical stripes as described by Rothschild for this form. Jordan figures four only (pl. 49 a *nec* 32 b).

(v) ♀ form *albostriatus,* Rothsch.

North Borneo (Tring Mus.).

Both wings with long white stripes, but no blue gloss.

(vi) ♀ form *juda,* Butler[1] (= *daja,* Rothsch.).

Matang and Kuching (Sar. Mus.). North and South-east Borneo (Tring Mus.).

Distinguished by the blue gloss on the outer half of the fore-wing, by the row of white hind-marginal spots in both wings and faint discal stripes, blue-white spot at end of cell and post-discal series of similar spots.

2. *Caunus*-form.

This is the rarer form in Borneo; both male and female are wonderful mimics of the common Euploea, *E. diocletianus lowi.*

(vii) ♂ and ♀ form *mendax,* Rothsch.

Malinau, Matang and Lundu (Sar. Mus.); North and South-east Borneo (Tring Mus.).

HELENUS-GROUP.

602. ***Papilio demolion,*** Cr.

Papilio demolion, Cramer, Pap. Exot. I, p. 140, pl. 89, figs. A, B, 1776.

Papilio demolion, Rothschild, *l.c.* p. 283, 1895.

Papilio demolion Jordan, *l.c.* p. 51, pl. 21 a, 1909.

Distribution: Tenasserim and Siam south to Sumatra, Java, Lombok and Borneo, with a sub-species on Nias and another on Palawan.

(a) Papilio demolion demolion, Cramer.

Mt. Kinabalu, Limbang, Kuching, Lundu (Sar. Mus.). A common butterfly in Sarawak.

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[1] Rothschild uses this name for a male form of *paradoxa telesicles,* but as it does not represent any well marked form, only one phase in a complete gradation of male forms, it has been rightly dropped by Jordan. The name is therefore still available for the very distinct female accurately described and figured by Butler in *Lepidoptera Exotica* 1870, pl. XIII, fig. 4. Rothschild's name *daja* appeared in 1895.

603. *Papilio nephelus,* Boisd.

Papilio nephelus, Boisduval, Spec. Gen. Lep. I, p. 210, 1836.
Papilio albolineatus, Forbes, Naturalist's Wand. E. Arch., p. 275, 1885.
Papilio nephelus saturnus, Rothschild, *l.c.* p. 290, 1895.
Papilio nephelus albolineatus, Jordan, *l.c.* p. 52, 1909.

Distribution: Malay Peninsula, Borneo, Java, Sumatra and the islands off the west coast of Sumatra. The typical form occurs in Java.

(a) *Papilio nephelus albolineatus,* Forbes.

Limbang, Malinau, Quop, Kuching (Sar. Mus.). Confined to Sumatra and Borneo.

604. *Papilio nubilus*, Staud.

Papilio nubilus, Staudinger, Iris VII, p. 344, 1895.
Papilio nubilus, Rothschild, *l.c.* p. 291, 1895.
Papilio nubilus, Jordan, *l.c.* p. 52, 1895.

A rare species only known from a single Brunei specimen, with a sub-species from South-east Sumatra, similarly only known from one specimen. Possibly these two specimens are only varieties of *nephelus*.

605. *Papilio helenus,* L.

Papilio helenus, Linn., Syst. Nat. (X), p. 459, 1758.
Papilio helenus, var. *enganius,* Doherty, Journ. As. Soc. Beng., p. 31, 1891.
Papilio helenus palawanicus, Rothschild, *l.c.* p. 287, 1895.
Papilio helenus enganius, Jordan, *l.c.* p. 54, 1909.

Distribution: Japan, China and India south to Malay Peninsula and Archipelago as far as Timor, but not on Celebes.

(a) *Papilio helenus enganius,* Doherty.

Mt. Kinabalu, Malinau, Dulit, Santubong and Satap (Sar. Mus.).

This sub-species occurs on Borneo, Sumatra, Java and Lombok. I noticed it as common by the side of a rocky stream on Kinabalu, where six to ten were often seen together drinking at some moist spot. With wings expanded but fore-wings lowered over the bright yellow spot on the hind-wing they easily escaped notice, but on being disturbed, raised the fore-wings and quite astonished me by the sudden display of colour, before taking flight.

The red lunules on the hind-margin of the hind-wing below vary in number from one to five, the two at the base of the tail disappearing first.

606. *Papilio iswara,* White.

Papilio iswara, White, Entomolog. I, p. 280, 1842.
Papilio araspes, Felder, Wien, Ent. Mon. III, p. 321, 1859.
Papilio iswara, Rothschild, *l.c.* p. 289, 1895.
Papilio iswara araspes, Jordan, *l.c.* p. 55, 1909.

Distribution: South Tenasserim, Malay Peninsula, Sumatra, Banka, Borneo, and Natunas.

(*a*) *Papilio iswara araspes*, Felder.

Marapok Mts., Mt. Matang, Mt. Santubong and Kuching (Sar. Mus.)

Only on Borneo and the Natunas.

607. *Papilio fuscus*, Goeze.

Papilio fuscus, Goeze, Ent. Beytr. III. (I), p. 87, 1779.
Papilio fuscus prexaspes, Rothschild, *l.c.* p. 297, 1895.
Papilio fuscus dayacus, Jordan, *l.c.* p. 56, 1909.

Distribution: Andamans to Solomons, though not found in Sumatra, Java, the small Sunda Isles or in the Philippines. A curious distribution suggesting direct communication between India and Papua via Borneo and Celebes.

(*a*) *Papilio fuscus dayacus*, Rothsch.

Mts. Santubong and Matang, Quop, Bau and Kuching (Sar. Mus.).

Known from North and South Borneo, with closely allied sub-species in the Andamans and Malay Peninsula.

POLYTES-Group.

608. *Papilio polytes*, Linn.

Papilio polytes, Linn., Syst. Nat. (X), p. 460, 1758.
Papilio theseus, Cramer, Pap. Exot. II, p. 128, pl. 180, fig. B, 1779.
Papilio polytes theseus, Rothschild, *l.c.* p. 349, 1895.
Papilio polytes theseus, Jordan, *l.c.* p. 61, pl. 30 c, ♀, 1909.
Papilio polytes valeria, Jordan, *l.c.* p. 62, 1909.

Distribution: India and China to Moluccas.

(*a*) *Papilio polytes theseus*, Cr.

Kinabalu, Limbang, Kuching (Sar. Mus.). A common butterfly in Sarawak.

This subspecies also occurs in Sumatra.

Four forms of the female have been recognized from Borneo, to which I now add one more.

(i) *nonia*, Jord., coloured like the male.

(ii) *theseus*, Cram., with red spots on hind-wing, but no white spots.

This is the common form of female in Sarawak. The red discal spots are variable, in some there are four, in others three, two, or only one on the inner margin. In one the spots are slightly elongated, showing an approach to the next form.

(iii) *melanides*, De Haan., red discal spots lengthened into stripes.

(iv) *numa,* Weber, discal spots of hind-wing white.
The two Sarawak examples of this form have two well developed white spots above the second and third median nervule and a third smaller one between the first and second median nervules. These white spots do not invade the cell.

(v) *ignea,* form. nov., has one large yellow spot in the end of cell and extending over the bases of the radial and median nervules, and outwardly bordered by the ordinary *theseus* row of red discal spots.
A single specimen from Kuching (Sar. Mus.).

(*b*) *Papilio polytes valeria,* Jordan.

Described from three females from Baram, Lawas and Mantanani Isles.

609. *Papilio acheron,* Gr. Sm.

Papilio acheron, Grose-Smith, Ann. Mag. Nat. Hist. (5) XX, p. 432, 1887.
Papilio acheron Grose-Smith and Kirby, Rhop. Exot. I, p. 11, pl. V, (Pap.) figs. 1, 2, ♂, 1888.
Papilio acheron, Rothschild, *l.c.* p. 331, 1895.
Papilio acheron, Jordan, *l.c.* p. 71, pl. 27 a, 1909.

Mt. Kinabalu, circ. 3,000 ft. (Sar. Mus.).

Only known from the mountains of North Borneo, (Kinabalu, Mulu, and Dulit).

A closely allied species or sub-species, *P. forbesi,* Gr.-Smith, occurs in the mountains of Sumatra.

The Kinabalu specimens vary slightly in the ochraceous band in hind-wing below, which in some examples fails to enclose the black patch below the third median nervule. In one the red pre-costal spot extends slightly below the costal nervure.

610. *Papilio lowi,* Druce.

Papilio lowii, Druce, Proc. Zool. Soc. Lond., p. 358, pl. XXXIII, fig. 6, 1873.
Papilio lowi, Rothschild, *l.c.* p. 321, 1895.
Papilio lowi, Jordan, *l.c.* p. 71, pl. 25 b, ♂, and 29 b, ♀, 1909.

Two forms of the female are recognized:

(i) form *zephyria* Jordan, in which the hind-wing has a "large white distally yellowish central area," and
(ii) form *suffusus* Lathy, in which the hind-wing is nearly all black, without the white area.

This species is said to come from North Borneo, Palawan and Balabac. Rothschild draws attention to the fact that Mr. Low's butterflies came from many islands besides Borneo and that they passed through several hands before coming to Mr. Druce who described this species, giving "Borneo" as locality. I suspect that the locality "Borneo" is wrong and that the species is really a tailed form of *memnon* confined to Palawan and Balabac, while Borneo has the tailless *memnon* only.[1]

611. *Papilio memnon*, Linn.

Papilio memnon, Linneus, Syst. Nat. (X), p. 460, 1758.
Papilio memnon, Rothschild, *l.c.* p. 314, 1895.
Papilio memnon, Jordan, *l.c.* p. 73, pl. 30 b ♀ and 48 b ♀, 1909.

The species ranges from Japan, China and North India to Malaya as far as Borneo, Lombok and Flores. The typical form is confined to Borneo, Java, Bunguran, Banka, Bawean and Bali. In Sumatra, Nias and Batu Islands there is a separate race, *anceus*, Cr. This is one of the very rare instances where Java and Borneo have the same form while that on Sumatra is distinct. However, Jordan notes that several of the female forms of this sub-species have more restricted ranges, thus four out of the five known in Borneo are not found elsewhere.

***(a) Papilio memnon memnon*,** Linn.

P. memnon is a common butterfly throughout Sarawak. The female forms are distinguished thus: —

(i) ♀ form *gyrtia*, Jord., fore-wing with red basal spot and white sub-apical area, otherwise very dark; hind-wing nearly pure black.

(ii) ♀ form *dobera*, Jord., sharply defined black basal area of fore-wing above, rest of wing broadly striped with whitish-grey. Not rare in Sarawak.

(iii) ♀ form *laomedon*, Cr., fore-wing brownish; hind-wing with two rows of black spots.

This is the common form in Sarawak. It also occurs in Java, Banka and the Natunas.

(iv) ♀ form *venusia*, Jord., hind-wing yellow with single row of reduced hind-marginal black patches.

A single example from Bintulu in Sarawak Museum.

(v) ♀ form *anura*, Jord., discal spots of hind-wing orange. Abdomen yellow, with black dorsal line and underside.

PARIS-Group.

612. *Papilio karna*, Felder.

Papilio karna, Felder, Verh. Zool.-bot. Ges. Wien, p. 323, 1864.
Papilio arjuna carnatus, Rothschild, *l.c.* p. 387, 1895.
Papilio karna carnatus, Jordan, *l.c.* p. 80, pl. 35 a, 1909.

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[1] Since writing the above Dr. K. Jordan has kindly written to me from Tring thus:—"We have several specimens of *Papilio lowi* said to be from North Borneo; they came a few years ago from a trustworthy dealer, but the collector may have deceived him."

Dr. Jordan then suggests that both *lowi* and *memnon* may really occur together in Borneo as he has the Palawan and ordinary Malayan forms of *Papilio antiphates* from the Limbang River in Borneo.

The typical form is confined to West Java; a sub-species to North-east Sumatra and another sub-species to North Borneo. The allied species—species *paris*—ranges from Formosa, China and India to the Malay Peninsula, Java and North-east Sumatra, but is not yet known from Borneo.

(a) *Papilio karna carnatus,* Rothschild.

Mt. Kinabalu, Limbang, Quop, Bau, Paku, Kuching (Sar. Mus.).

This gorgeous Swallow-tail is locally known as "the Sarawak Beauty"; it is not uncommon in old jungle where it prefers sunny clearings or streams.

613. *Papilio palinurus,* Fab.

Papilio palinurus, Fabricius, Mant. Ins. II, p. 2, 1787.
Papilio palinurus, Rothschild, *l.c.* p. 387, 1895.
Papilio palinurus, Jordan, *l.c.* p. 81, pl. 35 b, c, 1909.

Distribution: Burma to Malay Peninsula, Sumatra and Borneo, with sub-species in Nias, Palawan and the Philippines.

(a) *Papilio palinurus palinurus,* Fab.

Mt. Kinabalu, Limbang, Kuching (Sar. Mus.). Rather scarce in Sarawak.

Jordan states that "in most of the specimens from North Borneo the band is slightly blue: ab. *solinus* Fruhst." Those from Kinabalu and Sarawak are noticeably green in contrast to the blue-green of the previous species (*P. karna carnatus*).

614. *Papilio agetes,* Westw.

Papilio agetes, Westwood, Arc. Ent. II, p. 23, pl. 55, figs. 1, 2, 1843.
Papilio agetes, var. *insularis,* Staudinger, Iris. VII, p. 349, 1895.
Papilio agetes insularis, Rothschild, *l.c.* p. 417, 1895.
Papilio agetes kinabaluensis, Jordan, *l.c.* p. 87, 1909.

Distribution: Sikkim to Malay Peninsula, mountains of Sumatra and Borneo (Mt. Kinabalu).

(a) *Papilio agetes kinabaluensis,* Fruhstorfer.

This sub-species is confined to Kinabalu. I have not seen it.

615. *Papilio stratiotes,* Gr.-Smith.

Papilio stratiotes, Grose-Smith, Ann. Mag. Nat. Hist. (5) XX, p. 433, 1887.
Papilio stratiotes, Grose-Smith and Kirby, Rhop. Exot. II, Pap., p. 29, pl. XIII, figs. 1, 2, 1893.
Papilio stratiotes, Rothschild, *l.c.* p. 417, 1895.
Papilio stratiotes, l.c. p. 87, pl. 41 b, 1909.

Mt. Kinabalu and Malinau (Sar. Mus.).

Hitherto only known from Mt. Kinabalu; there is one specimen from Malinau, a hilly region near Mt. Molu in north-eastern Sarawak.

Not uncommon between 2,000-3,000 ft. on Kinabalu; and occasionally found on the banks of the Kadamaian river, where a Dusun horrified me by catching one in a cloth, which he had on his head at the time, extracting it therefrom in his fingers and then handing it to me—absolutely uninjured![1]

616. *Papilio aristeus,* Cr.

Papilio aristeus, Cramer, Pap. Exot. IV, p. 60, pl. 318, figs. E, F, 1782.
Papilio hermocrates, Felder, Verh. Zool.-bot. Ges. Wien, p. 302, 1864.
Papilio aristeus hermocrates, Rothschild, *l.c.* p. 420, 1895.
Papilio aristeus hermocrates, Jordan, *l.c.* p. 88, pl. 41 a, 1909.

Distribution: North India to Bismarck Islands and North Australia.

(*a*) *Papilio aristeus hermocrates,* Felder.

Mt. Kinabalu (Sar. Mus.).

Burma to Timor, excluding Java.

Two varieties have been named

(i) ab. *aristeoides,* Eimer, has narrow white discal area on fore-wing.
(ii) ab. *nigricans,* Eimer, cell of fore-wing with three white bands instead of four.

The single Kinabalu specimen in the Sarawak Museum is referable to ab. *aristeoides.*

617. *Papilio antiphates,* Cr.

Papilio antiphates, Cramer, Pap. Exot. I, p. 113, pl. 72, figs. A, B, 1775.
Papilio alcibiades, Fabricius, Mant. Ins. II, p. 8, 1787.
Papilio itamputi, Butler, Forbes' Natural. Wander. in East. Arch., p. 276, 1885.
Papilio antiphates alcibiades, Rothschild, *l.c.* p. 411, 1895.
Papilio antiphates itamputi, Jordan, *l.c.* p. 89, pl. 40 b, 1909.

Distribution: China, India, Ceylon and Malaya.

(*a*) *Papilio antiphates itamputi,* Butler.

Mt. Kinabalu, Malinau, Banting, Sadong, Kuching (Sar. Mus.).

This sub-species occurs in the Malay Peninsula, Sumatra, Borneo, Banguey Island and the Natunas.

A common species in Sarawak. The following varieties occur in the Sarawak Museum series: the 4th black band on the fore-wing similar to the 2nd and 3rd in even breadth and reaching the median nervure; in most specimens, this 4th band is wedge-shaped, tapering towards the median nervure, in some extending half way across the cell or less.

In two specimens from Kinabalu and Malinau, the two outer black bands are not joined towards the anal angle. As Butler expressly states of *itamputi* that "the external black border........(is) not completely divided by the green band," this aberration with divided bands may be distinguished as ab. *aperta,* nov.

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[1] A Dusun on Kinabalu assured me that *P. stratiotes* and *P. antiphates* were sexes of the same species and that he had caught them *in cop.*

618. *Papilio euphrates,* Felder.

Papilio euphrates, Felder, Wien Ent. Mon. VI, p. 283, 1862.
Papilio antiphates, var. *decolor,* Staudinger, Iris, I, p. 279, 1888.
Papilio antiphates decolor, Rothschild, *l.c.* p. 413, 1895.
Papilio euphrates decolor, Jordan, *l.c.* p. 90, 1909.

Ranges from North Borneo to the Philippines.

(*a*) *Papilio euphrates decolor,* Staudinger.

Mt. Kinabalu, 3000 ft. (Sar. Mus.).

This sub-species is confined to North Borneo, Banguey and Palawan.

I have referred one Kinabalu specimen to this form, as the inner portion of the median band in the hind-wing below only just passes the cell limit and the succeeding black spot is very small. In *antiphates itamputi* the spot is always larger and the median line extended well below the apex of cell. In this specimen, as in *itamputi* ab. *aperta,* the two outer black bands of the fore-wing above are not joined anally.

619. *Papilio payeni,* Boisd.

Papilio payeni, Boisduval, Spec. Gén. Lep. I, p. 235, 1836.
Papilio brunei, Fruhstorfer, Ent. Nachr., p. 300, 1894.
Papilio payeni brunei, Rothschild, *l.c.* p. 401, 1895.
Papilio payeni brunei, Jordan, *l.c.* p. 92, 1909.

Distribution: Sikkim and Hainan to Malay Peninsula and the Greater Sunda Isles.

(*a*) *Papilio payeni brunei,* Fruhstorfer.

Malinau, Mt. Matang, 3200 ft. and Quop (Sar. Mus.).

North and South-east Borneo only. A rare species.

CODRUS-Group.

620. *Papilio empedocles,* Fab.

Papilio empedocles, Fabricius, Mant. Ins. II, p. 10, 1787.
Papilio empedocles, Rothschild, *l.c.* p. 427, 1895.
Papilio empedocles, Jordan, *l.c.* p. 93, pl. 42 c, 1909.

Kuching and Quop (Sar. Mus.).

Distribution: Malay Peninsula, Greater Sunda Isles, Banka and Palawan.

The only variation exhibited by the Sarawak Museum series is in the yellow spots of the fore-wing. These should be six in number, the 1st and 3rd much smaller than the others. In one specimen the 1st is absent, in another the 3rd.

Jordan notes that the species flies in the hills. All the Sarawak specimens come from low-country.

EURYPYLUS-Group.

621. *Papilio sarpedon,* Linn.

Papilio sarpedon, Linneus, Syst. Nat. (X), p. 46, 1758.
Papilio sarpedon, Rothschild, *l.c.* p. 440, 1895.
Papilio sarpedon, Jordan, *l.c.* p. 94, pl. 44 d, 1909.

Mt. Kinabalu, Limbang, Kuching, Quop (Sar. Mus.).

Distribution: China and Japan to the Solomon Islands. The typical form ranges from North India, Tonkin, Hainan and Philippines south to Malay Archipelago as far as Lombok.

A common species in Sarawak, exhibiting hardly any variation.

622. *Papilio doson,* Felder.

Papilio doson, Felder, Verh. Zool.-bot. Ges. Wien, p. 305, 1864.
Papilio jason, var. *evemonides,* Honrath, Berl. Ent. Zeit., p. 396, pl. 10, fig. 2, 1884.
Papilio eurypylus axion, Rothschild, *l.c.* p. 433, 1895.
Papilio doson evemonides, Jordan, *l.c.* p. 97, 1909.

Distribution: India, China and Malaya.

(*a*) *Papilio doson evemonides,* Honrath.

Mt. Kinabalu, Kuching and Quop (Sar. Mus.).

This sub-species ranges over the Malay Peninsula and Greater Sunda Isles, including Banka and the Natunas.

623. *Papilio evemon,* Boisduv.

Papilio evemon, Boisduval, Spec. Gén. Lep. I, p. 234, 1836.
Papilio evemon, Rothschild, *l.c.* p. 436, 1895.
Papilio evemon orthia, Jordan, *l.c.* p. 98, 1909.

Distribution: Assam to Malay Peninsula and Greater Sunda Isles including Nias and Banka.

(*a*) *Papilio evemon orthia,* Jordan.

Kuching and Quop (Sar. Mus.).

This subspecies is confined to the Malay Peninsula, Sumatra, Banka and Borneo.

This and *bathycloides* appear to be the commonest species of this group in Sarawak, though it is very likely that the other two species (*mecisteus* and *evemonides*) are frequently passed over in collecting, owing to their great similarity to one another.

624. *Papilio eurypylus,* Linn.

Papilio eurypylus, Linneus, Syst. Nat. (X), p. 464, 1758.
Papilio mecisteus, Distant, Rhop. Malay., p. 361, fig. 108, 1885.
Papilio eurypylus axion, ab. *mecisteus,* Rothschild, *l.c.* p. 434, 1895.
Papilio eurypylus mecisteus, Jordan, *l.c.* p. 98, 1909.

Distribution: India, China, Malaya and Australia.

(*a*) *Papilio eurypylus mecisteus,* Distant.

Kuching (Sar. Mus.). A single specimen.

This sub-species is confined to the Malay Peninsula, Greater Sunda Isles and Palawan.

625. *Papilio procles,* Grose-Smith.

Papilio procles, Grose-Smith, Ann. Mag. Nat. Hist. (5) XX, p. 433, 1887
Papilio procles, Grose-Smith and Kirby, Rhop. Exot. I, p. 13 pl. VI, (Pap.), figs. 1, 2, 1888.
Papilio procles, Rothschild, *l.c.* p. 436, 1895.
Papilio procles, Jordan, *l.c.* p. 99, pl. 44 b, 1909.

Mt. Kinabalu (Sar. Mus.).

Not known from any other locality.

626. *Papilio bathycles,* Zink.

Papilio bathycles, Zinken, Nov. Act. Ac. Nat. Cur., p. 157, pl. 14, figs. 6, 7, 1831.
Papilio bathycles, var. *bathycloides,* Honrath, Berl. Ent. Zeit. XXVIII, p. 396, pl. 10, fig. 3, 1884.
Papilio bathycles bathycloides, Rothschild, *l.c.* p. 438, 1895.
Papilio bathycles bathycloides, Jordan, *l.c.* p. 100, pl. 44 c, 1909.

Distribution: India to the Greater Sunda Isles and Palawan.

(*a*) *Papilio bathycles bathycloides,* Honrath.

Limbang and Kuching (Sar. Mus.).

This sub-species ranges over the Malay Peninsula, Sumatra Borneo, and Palawan. The type form (*bathycles*) occurs on Java only.

627. *Papilio agamemnon,* Linn.

Papilio agamemnon, Linneus, Syst. Nat. (X), p. 462, 1758.
Papilio agamemnon, Rothschild, *l.c.* p. 447, 1895.
Papilio agamemnon, Jordan, *l.c.* p. 101, pl. 45 d, 1909.

Distribution: India, China, and Malaya to Australia.

The typical form ranges from India and China to Bali and the Philippines, with sub-species in the Papuan region down to Queensland and the Solomon Isles.

(a) Papilio agamemnon agamemnon, Linn.

A common species in Sarawak and often seen with other Papilios of this Eurypylus-Group crowded together on some wet patch of sand on a river bank. In its natural surroundings in the jungle it is very difficult to see both in flight and at rest. It thus affords an excellent proof of the procryptic value of a " broken up " pattern over one which is unicolorous, however dark and suited to its surroundings.

In a cabinet drawer, however, like many other protectively coloured butterflies, it forms a conspicuous object of beauty.

628. *Papilio arycles,* Boisd.

Papilio arycles, Boisduval, Spec. Gén. Lep. I, p. 231, 1836.
Papilio arycles, Rothschild, *l.c.* p. 446, 1895.
Papilio arycles, Jordan, *l.c.* p. 102, pl. 45 c, d, 1909.

A tailless species ranging from the Shan States and Malay Peninsula to the Greater Sunda Isles, Banka and Palawan.

Gray records this in the British Museum from Borneo and Butler among the lepidoptera collected by W. B. Pryer at Sandakan. Not in the Sarawak Museum collection.

MACAREUS-Group.

629. *Papilio macareus,* Godt.

Papilio macareus, Godart, Enc. Meth. IX, p. 76, 1819.
Papilio macaristus, Grose-Smith, Ann. Mag. Nat. Hist. (5) XX, p. 434, 1887.
Papilio macareus macaristus, Rothschild, *l.c.* p. 457, 1895.
Papilio macareus macaristus, Jordan, *l.c.* p. 104, pl. 47, b, 1909.

Distribution: North India to Hainan, Philippines and Bali.

(a) *Papilio macareus macaristus,* Grose-Smith.

Mt. Matang 3,200 ft., Bidi, Bau, Satap, Kuching (Sar. Mus.).

This sub-species is confined to Borneo. It is rare in Sarawak. A good mimic of the common Danaine *D. vulgaris*, Butl.

630. *Papilio leucothoe,* Westw.

Papilio leucothoe, Westwood, Arc. Ent. II, p. 128, pl. 79. fig. 3, 1845.
Papilio ramaceus, Westwood, Trans. Ent. Soc. Lond., p. 95, pl. 5, fig. 3, 1872.
Papilio leucothoe ramaceus, Rothschild, *l.c.* p. 459, 1895.
Papilio leucothoe ramaceus, Jordan, *l.c.* p. 105, pl. 47 b, 1909.

Distribution: Malay Peninsula, Sumatra and Borneo.

(a) *Papilio leucothoe ramaceus,* Westwood.

Mt. Matang, 3,200 ft., Kuching and Quop (Sar. Mus.).

This sub-species is confined to Borneo. It is very rare in Sarawak. A good mimic of *Euploea zonatus*, Druce.

631. *Papilio delesserti,* Guérin.

Papilio delesserti, Guérin, Rev. Zool., p. 233, 1839.
Papilio eatoris, Grose-Smith, Ann. Mag. Nat. Hist. (6) X, p. 426, 1892.
Papilio delesserti, Rothschild, *l.c.* p. 459, 1895.
Papilio delesserti, Jordan, *l.c.* p. 105, pl. 47 c, 1909.

Distribution: Malay Peninsula, Greater Sunda Isles, Banka and Natunas, with a sub-species in Nias and another in Palawan.

(a) *Papilio delesserti delesserti,* Guérin.

Trusan, Malinau, Simanggang, Kuching, Bau, Quop (Sar. Mus.).

A good mimic (the female in particular) of the Danaine *Ideopsis daos* and the moth *Cyclosia pieridoides*.

In most of the Sarawak males the cell in fore-wing above has an outer border of five small white spots, the 1st on costa, the 5th above the 3rd median nervule. But in some the 2nd and 3rd are partially fused with the distal streaks of white ground-colour; in one the 2nd, 3rd and 4th are completely fused as in the females.

632. *Papilio megarus*, Westw.

Papilio megarus, Westwood, Arc. Ent. II, p. 98, pl. 72, fig. 2, 1845.
Papilio megarus, Rothschild, *l.c.* p. 460, 1895.
Papilio megarus sagittiger, Jordan, *l.c.* p. 106, 1909.

Distribution: Assam, Tonkin and Hainan south to the Malay Peninsula, Sumatra and Borneo.

(a) *Papilio megarus sagittiger*, Fruhstorfer.

This sub-species is confined to North Borneo. A closely allied form (*fleximacula*) has been found on Banguey Isle.

Genus, LEPTOCIRCUS, Swains.

1 Band across both wings white .. .. CURIUS.
1¹ Band across both wings blue-green .. .. MEGES.

633. *Leptocircus curius*, Fab.

Leptocircus curius, Fabricius, Mant. Ins. II, p. 9, 1787.
Leptocircus curius, Jordan, *l.c.* p. 108, 1909.

Distribution: North China to Malaya as far as Palawan, Borneo and Java. The typical form ranges from Assam to the Malay Peninsula, Greater Sunda Isles and Palawan.

(a) *Leptocircus curius curius*, Fab.

Mt. Kinabalu, Limbang, Kakus, Kuching, Quop (Sar. Mus.).

This is the common species of the two. Both occur in the same localities. Rather like dragonflies darting swiftly over water, then hovering for a few moments with long quivering tails. They are easy to catch thus at flowers.

634. *Leptocircus meges*, Zink.

Leptocircus meges, Zinken, Nov. Act. Ac. Nat. Cur., p. 161, 1832.
Leptocircus meges, Jordan, *l.c.* p. 108, pl. 49 d, 1909.

Distribution: South China to Malaya as far as the Philippines and Celebes. The typical form is confined to the Greater Sunda Isles.

(a) *Leptocircus meges meges*, Zink.

Mt. Kinabalu, Kakus, Busau, Satap (Sar. Mus.).